REPORT RESUMES

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DEVELOPMENT OF A FORCED-CHOICE TEST OF ACHIEVEMENT MOTIVATION.
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DESCRIPTORS- *QUESTIONNAIRES, *STATISTICAL ANALYSIS, *COLLEGE STUDENTS, *MOTIVATION, *ACHIEVEMENT, BEHAVIOR, NEEDS, TESTS, BLOOMINGTON, INDIANA, SENTENCE COMPLETION TEST (SCT)

THE GOAL OF THIS STUDY WAS TO DEVELOP A FORCED-CHOICE QUESTIONNAIRE WHICH COULD RELIABLY AND EFFECTIVELY MEASURE THE ACHIEVEMENT NEEDS OF AMERICAN COLLEGE STUDENTS. THE NEED FOR ACHIEVEMENT IS DEFINED OPERATIONALLY AS BEHAVIOR WHICH SHOWS EFFORT TO DO ONE'S BEST, TO DO BETTER THAN OTHERS, OR IN GENERAL, TO ACCOMPLISH SOMETHING TO ONE'S OWN SATISFACTION. WHERRY'S METHOD OF PAIRING ITEMS WAS THE MAIN TECHNIQUE FOLLOWED IN THE DEVELOPMENT OF THE PROPOSED TEST. THE TECHNIQUE REQUIRED THE SUBJECT TO CHOOSE BETWEEN TWO OR MORE DESCRIPTIVE TERMS OR PHRASES THAT--(1) APPEAR EQUALLY ACCEPTABLE BUT DIFFERED IN VALIDITY AND (2) APPEARED CLOSE TO EACH OTHER IN TERMS OF SOCIAL DESIRABILITY VALUE. THE INITIAL FORM OF THE SENTENCE COMPLETION TEST (SCT) CONTAINED 76 TRIADS. ITEM ANALYSIS OF TEST RESULTS FROM 370 COLLEGE STUDENTS PROVIDED THE BASIS FOR RETAINING 50 TRIADS AS THE FINAL EXPERIMENTAL EDITION OF THE SCT. A TOTAL OF 643 STUDENTS IN 5 SAMPLE GROUPS WERE GIVEN THE SCT. VARIOUS STATISTICAL ANALYSES WERE PERFORMED ON THE DATA. THE TEST WAS FOUND TO BE INTERNALLY CONSISTENT, RELIABLE, AND VALID FOR THE PREDICTION OF BEHAVIOR ASSOCIATED WITH ACHIEVEMENT MOTIVATION. NO ATTEMPT WAS MADE TO EVALUATE WHETHER THE MATCHING OF ITEMS ELIMINATED THE INFLUENCE OF SOCIAL DESIRABILITY. THOUGH FURTHER VALIDATION STUDIES ARE REQUIRED, FINDINGS OF THE STUDY SUGGESTED THE TEST COULD BE SAFELY USED FOR THE PURPOSE OF RESEARCH. (JM)

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DEVELOPMENT OF A FORCED-CHOICE TEST OF ACHIEVEMENT MOTIVATION

Cooperative Research Project No. S-113

ED003459

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August 1964

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CHAPTER I

ASSESSMENT OF ACHIEVEMENT MOTIVATION

A. Introduction

The need for achievement (n Ach) is defined operationally as behavior which shows effort to do one's best, to do better than others, or in general, to accomplish something to one's own satisfaction. It is concerned with one's zeal for doing a constructive work, whatever the nature of work it may be. It reflects a "desire to move ahead to the ultimate goal" (Atkinson, 1958, p. 722)[1]. High achievement motivation is generally associated with striving and effectiveness (DeCharms et al, in McClelland, 1955, p.421). The positive aspect of achievement motivation is to have a sense of attainment, self actualization, or self fulfillment (Maslow, 1954). The n Ach is characterized by a desire to attain a high standard of objective accomplishment; to increase self-regard by successful exercise of talent, and to select hard tasks and high aspiration level (Murray, 1938; Frenkel-Brunswik, 1942; McClelland, et al, 1953). At a common-sense level, need achievement refers to behavior which shows effort to accomplish something, to excel over others in performance. It is, however, totally different from mere exhibitionism (showing off without doing anything useful) and from dominance (desire to boss others around), although it is sometimes difficult to decide which label to apply in a specific act. Achievement motivation can be expressed through a wide range of behavior, some of which may not be at all concerned with academic or vocational goals. It might find an outlet in

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[1] Names and/or dates in the brackets refer to the References listed at the end.

"non-professional" "hobby-type" behavior or even in the religious activity of an individual whose drive to excel others finds release through piety or sacred literature.

B. Background

The concept of need achievement was first formalized by Murray (1938) who defined it largely upon the basis of subjective clinical methods of observations. Although the concept witnessed considerable amount of enthusiasm on the part of clinical psychologists soon after Murray's (1938) publication of Explorations in Personality not much work was done to assess n Ach properly until 1947. Since then it has become a subject of intensive study by McClelland and his associates who have been working hard to investigate the nature and function of the "hard work" motive. From their work has grown a technique to interpret fantasy production for n Ach. To describe the technique briefly, subjects are shown pictures very similar to those used in Thematic Apperception Test. They are asked to write brief stories about the pictures, and their stories are scored according to a set of rules for recognizing achievement related content. Although the technique appears to have a "real promise as far as the criteria of unique variation and of relational fertility are concerned" (McClelland, In Atkinson, 1958, p. 41), in terms of test retest reliability it falls short of the conventional standard. The test-reliabilities reported for the McClelland n Ach test for one week (McClelland, 1955), and nine-weeks (Krumboltz and Farquhar, 1957), appear to be extremely low. Product-moment coefficients of equivalence-stability has been reported to range from +.22 (Lowell, 1950) to +.64 (Morgan, 1953). Birney (1959) investigated the problem more thoroughly and found that the n Ach measures obtained using McClelland's technique was "highly situational in character as reflected by the low coefficients of equivilence-stability" (Birney, 1959, p. 267). The coefficients ranged from .03 to .56 and most of them were quite low. The inter-scorer reliability for n Ach score has been reported to be considerably low (Hedlund, 1953; Lindzey and Heineman, 1955). Moreover, the test has the disadvantage of requiring a careful content analysis of fantasy materials which needs a special professional training on the part of the tester. Although this procedure has recently been extended by French (1958) to group administration and objective scoring, it still is very time consuming and may not yield scores possessing satisfactory reliability. Himmelstein and Kimbrough (1960) reported a test-retest reliability for Form I of French's (1958) Test of Insight scores for n Ach for 50 males and 24 females combined of .36 ; for male alone .44. Alternate forms of n-Ach reliability for 66 males and 15 females combined was .17; for males alone, .24; female alone, .02.

Another independent measure of achievement motivation that has become popular as a research tool in recent years, is the n-Ach subscale of Edwards Personal Preference Schedule (EPPS). The EPPS (Edwards, 1954, 1959) uses a forced-choice format which is supposed to eliminate the problem of "response bias" or faking, so common in usual true-false personality questionnaires. Although the matching of the items was designed primarily to eliminate the effects of social desirability of the test items, there is some question (Corah, et al, 1958; Corah, 1961, Edwards, et al, 1959) as to how successfully this has been done. Studies on faking indicate that scores on the EPPS can be deliberately altered to create more favorable impressions, especially for specific purposes (Borislow, 1958; Dicken, 1959). Moreover, in the whole schedule, only ten items are purported to measure n Ach. In view of this, the reliability of this schedule can not be very high although Edwards (1954) reports that for a group of 89 students at the University of Washington, who were examined after a one-week interval, the reliability of n Ach scale of EPPS was nearly .74.

The EPPS is a face-valid test, the construction of which suggests greater concern with the control of undesirable test-taking attitudes, particularly social desirability, than with empirically-derived validity in the traditional sense (Edwards, 1959) although the concurrent validity of EPPS n Ach scale (Bendig, 1957; Himmelstein et al, 1958; McClelland, 1958; Marlowe, 1959; Melikian, 1958) as well as its construct validities have been recently reported (Worell, 1960; Krug, 1959). Because of this emphasis, the EPPS would become all the more vulnerable to undesirable test taking distortions should these built-in controls prove to be ineffective (Feldman and Corah, 1960).

When attempts are made to evaluate the validity of the EPPS, as McKee and Turner (1961) did, it soon becomes clear that the lack of concern with empirical validity at the test construction stage eventuates in low predictive power.

In addition to these shortcomings, a brief comment regarding other technical aspects of EPPS is in order. The format of EPPS is such that it requires the subject to order fifteen of Murray's (1938) manifest needs in terms of their applicability to himself. This provides a suitable way of quantifying the relative strength of competing needs within a single individual. On such a test it is impossible for an individual to receive a high score or a low score consistently on all the subscales. While such ipsative scores have great significance in personality assessment, they may also compel a person with a relatively high standing on the n Ach continum, in the population of individuals, to rate himself quite low in the n Ach subscale of EPPS if his other manifest needs are relatively stronger. The forced-choice format in EPPS, therefore, has the disadvantage of giving the relative preferences for one pattern of motive over another but does not reveal anything about the absolute level of that motive. This may be avoided by presenting the subject a large pool of items arranged in forced-choice format where the items pertaining to n Ach appear more frequently than any other type of item. This type of forced-choice test is more likely to yield a normative n Ach score for each subject without maximizing the effect of social desirability.

The Iowa Picture Interpretation Test (IPIT) is another multiple choice variation of TAT which provides objective scores on variables labeled Achievement Imagery, Insecurity, Blandness, and Hostility (Johnston, 1957). The test-retest reliability over a six-week retest interval for Achievement Imagery has been reported to be .52 based on the testing of 100 Michigan State College introductory psychology students (Hurley, 1955). Construct validity of IPIT has been provided by a series of studies in which relationship that were predicted in advance have been found between IPIT scores and such diversive behaviors as frequency of nonsense syllable anticipations (Hurley, 1953), electric maze learning (Johnston, 1955), and performance on an arithmetical task (Williams, 1955).

Although not much known, the Need Scale (NS) developed by Heilburn (1959) is another tool measuring more or less the same variable as measured by the EPPS n Ach scale. The NS Achievement scale is scored from the Adjective Check List (Gough, 1960) by subtracting the number of adjectives endorsed as self-characteristic, which contra-indicate a high achievement need, from the number of endorsed adjectives indicating the presence of n Ach in the endorser. There are no built-in checks for social desirability on the Adjective Check List, such as forced-choice items or subtle items; and except for instructional encouragement to be frank, the testee is unrestricted in his endorsement of adjectives so far as their social desirability is concerned.

From the foregoing discussion, it seems that although the projective technique of assessing n Ach has contributed significantly to our existing knowledge regarding the conceptual and methodological aspects of the achievement motivation construct, the measures derived from it lack the reliability necessary for individual prediction. The paper-pencil measures also do not appear to be satisfactory.

One solution to this might be to develop inventories and questionnaires which according to Krumboltz (1957) appears to be the most efficient and effective approach to the measurement of achievement motivation; but in view of the fact that questionnaire methods generally fail to prevent faking or response bias, not much reliance can be put in ordinary true-false type of inventories. However, if special techniques are followed in developing a questionnaire in order to minimize deliberate faking, the tool so constructed will have the advantage at least of higher reliability and "face" validity.

C. Problem

It is the aim of the present study to develop a forced-choice questionnaire which can reliably and effectively measure achievement needs particularly of American college students. In developing the test, it was taken for granted that in American culture individuals are highly encouraged to strive for high goals, to advance themselves in all possible walks of life, to maintain a high standard of excellence and to enter into all possible competitive situations. There could be few taboos attached to the attainments of achievement goals, and consequently n Ach should be more readily assessable by suitable questionnaires than by any other known projective measures.

D. Objectives

The major objective of the study was to develop a paper-pencil measure of achievement motivation for college students following Wherry's (1945) method of forced-choice technique. The specific purposes were as follows:

1. To construct a questionnaire consisting of a large number of forced-choice triads for assessing n Ach.
2. To examine the test-retest reliability of the questionnaire after an interval of nearly two months.
3. To study how internally consistent the different triads of the proposed test are.
4. To analyse the factorial dimension of the proposed test.
5. To establish the concurrent as well as construct validity of the test.
6. To explore the possibility of deriving a configurational key of the test and examine the reliability and cross validity of the key.

E. Importance of the Study

Our brief discussion of the various approaches appearing under section B together with the excellent review by Krumboltz (1957) should make it clear that we have not made a real break through as yet in so far as an objective assessment of need achievement is concerned. Few psychologists would deny that given a choice between an objective test and a projective test of n Ach, the former would be preferred in most situations, if it were guaranteed that the chosen test fulfills the conventional standards of test-retest reliability, and validity apart from tackling satisfactorily the problems of faking and malingering. Research to date, however, has failed to demonstrate the superiority of the existing objective measurements over the work done with varied projective procedures both in terms of conceptual and methodological considerations. Studies which have used objective tests, e.g., Atkinson and Litwin (1960), Barnette (1961), deCharms, Morrison et al, 1955, Izard (1962), have generally failed to reproduce the results typically found with projective measures. This, however, should not be construed to mean that it is not possible to construct a suitable objective test of achievement motivation. The present study as a matter of fact demonstrates an attempt to examine seriously McClelland's (1958) argument that n Ach can only be measured with projective techniques. The need for developing a forced-choice test of n Ach was also suggested by the fact that ratings of motivational level made by observers did not seem to relate to subsequent behavior in a meaningful way; and by the theoretical consideration that this lack of relationship could be predicted. Moreover, ratings either by the individual himself or by somebody who knows him throughly can be very much distorted like conventional questionnaires, because of personal bias, projection and halo effect. Observer's judgments, even he is very objective, are essentially based on observed segment of behavior. A man is observed to be working hard and the observer assumes he is motivated by, for example, a desire to succeed in his job. Actually, the worker may be motivated by a desire to please his wife rather than getting any satisfaction out of the job itself. Thus to infer motivation from behavior sometimes may be quite misleading. A measure independent of the behavior to be studied is necessary for an adequate inference.

Since the proposed test seems to have value at least as a tool for experimental studies of motivation it is the purpose of this report to describe it in detail. The rationale underlying the development, the nature of the resulting test, its properties and the scoring system will be presented in order that persons interested in the completed and ongoing studies may have a complete understanding of them, and persons wishing to use the method themselves will be able to do so.

The study reported here also suggests a possible way of circumventing the problem of response sets and distortions which continues to sap the validity of structured tests of personality. "Though more has been learned about the nature and operation of such factors, methods that will control them better are still needed" (Katzell and Katzell, 1962).

CHAPTER II

CONSTRUCTION OF PRELIMINARY FORMS

A. The Forced-Choice Technique

In the development of the proposed test, the main technique that was followed is Wherry's (1945) method of pairing items objectively on differential validity and subjectively on social desirability. The technique is described in detail by Rundquist (1950) in Handbook of Applied Psychology, Volume One, Page 184, edited by Fryer and Henry (1950). Briefly, the technique requires the subject to choose between two or more descriptive terms or phrases that appear equally acceptable but differ in validity. The matched phrases appearing in pair or triad or tetrad or even pentad are so constructed that in terms of social desirability value they appear pretty close to each other. The matched phrases may all be desirable or undesirable. The subject is asked to indicate which of the matched phrases is most characteristic and which least characteristic of himself.

The construction of a forced-choice inventory or a rating form essentially requires two principal types of information regarding each descriptive statement or phrase, viz., its social desirability or "preference index" and its empirical validity or "discriminative index" (Baier, 1951; Jurgenson, 1944; Shipley, et al, 1946; Sisson, 1948; Travers, 1951; Lanman and Remmers, 1954; Gordon, 1951; Berkshire and Highland, 1953; Berkshire, 1958; Saltz et al, 1962). The discriminative index may be determined on the basis of any specific criterion the inventory or rating form is designed to predict, such as academic achievement, or success in a particular training program or job. In the present study, although the amount of constructive output such as academic achievement, construction of technical tools, painting, story writing, publication of articles in high school and college magazines, etc. could have served as a satisfactory external criterion for establishing the discrimination index of each statement, they were not readily available and instead items were rated by a group of psychologists in terms of their "face validity" for measuring n Ach.

B. Procedure

The following steps were followed in order to obtain a satisfactory matching of the triads appearing in the proposed test:

1. A pool of 298 descriptive statements, many of which having the same beginning phrase, was established. Nearly one third of these appeared to have face validity for measuring n Ach. They were written on the assumption that a person with a strong achievement motivation is he who

    a. is interested in making a long record of achievement,
    b. loves a competitive situation,
    c. is optimistic,
    d. is industrious, persistent,
    e. keeps a high goal and standard,
    f. cares about his future,
    g. prefers difficult and challenging tasks to easy ones,
    h. wants successful completion of the task undertaken,
    i. aspires to be a recognized authority in his own profession, and
    j. is anxious to do something great.

Several items were written to represent each one of the above aspects of achievement motivation.

2. These 298 statements of which two-thirds were drawn to represent other manifest needs such as dominance, need nurturance, exhibitionism, orderliness, etc. were rated by approximately 100 introductory psychology students at the Southeastern Campus of Indiana University, Jeffersonville, Indiana. They indicated on a seven point scale the social desirability value of these items.

3. These 298 items were then scaled in terms of their subjective relevancy to the concept of achievement motivation. Ten judges, all psychologists, were instructed to rate on a 7 point scale the face validity of each of the items for measuring n Ach as defined in the Introductory Section of Chapter I.

4. From these ratings, both preference as well as "face validity" indices were calculated for each statement. Then a search was made for three descriptive statements which had more or less the same preference index but two of which had almost zero validity while the remaining one, a high face validity for measuring n Ach. Following this method of matching, 76 triads were established which formed an initial research form of the test.

5. The initial form was then tried out on a sample of 370 college students for the purpose of item analysis in which item-total correlations served as the only criterion for item rejection. Kelley's (1939) method of item analysis based on 27 per cent upper and 27 per cent lower groups was followed using the data of only 200 subjects. The biserial correlations were established for each set of triads from an abac given in Guilford (1954, p.428). Triads for which the estimated item-total correlation was

below .20 were discarded. Based on the item analysis data, 50 triads were retained which formed the final experimental edition of the test. The final form of the test appears in Appendix A. On the extreme left of each triad, the respective item-total biserial correlation is shown. The figures appearing on the extreme right columns are the discrimination index and preference index of each descriptive statement. The inter-item correlations in the form of tetrachoric correlation coefficient as well as phi coefficient are presented in chapter VI.

To maintain a nonrevealing situation, the instructions on the test sheets gave no information as to the purpose of the test and the questionnaire was entitled Sentence Completion Test (SCT). The task for each S was to encircle on the separate answer sheet the letter for each triad that corresponded most with his present characteristics or feelings and to cross out the letter that was least true of him.

In scoring the proposed test, the conventional method of evaluation was followed. Ss encircling the item of a particular triad which had the highest discrimination index received one, otherwise zero. Such items are asterisked in the final form that appears in Appendix A. Neither partial credit nor any penalty was made for encircling other items of the triad. In the conventional key, no credit or discredit was given for items crossed out to signify the least characteristic. They were simply ignored.

CHAPTER III

THE PRELIMINARY EXPERIMENTS & RESULTS

The primary purpose of these studies was to obtain the cross validation of the descriptive statistics derived from the raw scores of the Sentence Completion Test and to study the intercorrelational characteristics of the test with various other tests.

A. Initial Cross-Validation Studies

Subjects

Results obtained from three different samples are reported under this section. All Ss were students enrolled in the Southeastern Campus of Indiana University. Sample I consisted of 263 students from different sections of Introductory Psychology. Most of them were freshmen. In Sample 2, all 87 students were freshmen and enrolled in two sections of an introductory psychology class given during Fall 1963 semester. There were 51 male and 36 female students in this sample. The mean age for this sample was 19.76 years. The SCT was administered also to a third group of 58 male and female students more heterogeneous in population characteristics than the former groups. Most of these subjects of Sample 3 were enrolled in a junior level abnormal psychology class. There were approximately equal number of male and female students in this group whose ages ranged from 19 to 39 years.

Procedure

Mimeographed copies of SCT were circulated to all students of Sample 1 and Sample 2 immediately after few class meetings. They were urged to fill out the questionnaire and return it along with the completed answer sheets within a week from the day they were distributed. Almost 97 per cent of the students turned in the answer sheets before time. They filled out the questionnaire in their leisure time.

In the case of Sample 3, the SCT was administered during a regularly scheduled class period under a liberal time limit. Almost 70 per cent of the students could complete the test within 25 minutes. In some cases, the completion time reached almost 45 minutes.

Results

Means, ranges, and standard deviations for the three samples appear separately on Table 1. The frequency distribution of SCT scores for Sample 1 alone is given in Table 2.

TABLE 1

Comparison of Three Samples in terms of Descriptive Statistics

Statistic	Sample 1 (N = 263)	Sample 2(N=87)	Sample 3(N=58)
Mean	16.50	15.46	16.53
Standard Deviation	6.09	4.88	5.94
Range	6-41	7-25	6-39

A comparison of the three groups in terms of the distribution of SCT scores, means, measures of variability indicated similar results. This provided an initial cross validity of the test results.

TABLE 2

Frequency Distribution of Scores on Sentence Completion Test

For a Sample of 263 Indiana University Undergraduates

Class-interval	frequency
40-41	2
38-39	0
36-37	0
34-35	2
32-33	1
30-31	3
28-29	2
26-27	3
24-25	20
22-23	16
20-21	21
18-19	32
16-17	38
14-15	39
12-13	36
10-11	23
8-9	16
6-7	9
4-5	0

Mean = 16.50 S.D. = 6.09

B. Intercorrelation Study

In addition to SCT, the second sample was given a large number of psychological tests including twenty tests from Thurstone's (1938) PMA, Taylor's (1953) Manifest Anxiety Scale, the Word Endings and Word Beginnings Test which have been adapted by Educational Testing Service, Princeton, N.J. (French, et al, 1963) from Thurstone and Thurstone's (1941) Suffixes and Prefixes respectively and a Code Substitution task. These tests were given to the 87 Ss of Sample 2 as a part of another research project on ability pattern and learning efficiency.[2] For measuring flexibility of closure factor, the Hidden Figures and Hidden Patterns Tests as modified by ETS (French et al, 1963) were also included in the battery.

Procedure

All the tests were administered in groups of nearly 40 students at a time during the regular class hours. Since the whole group agreed to take the tests on the condition that each participant would be counseled later on by the investigator, there was evidence of an optimal motivation on the part of Ss. Not more than four tests were administered at a time and in each case there was at least 5 min. rest between tests. All the testing sessions were held between November 13 and December 17, 1963. The testing schedule appears in Appendix B.

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[2] The research was supported partly by the Graduate School, Indiana University. The facilities obtained from the Child Development Unit of the University of Louisville Medical School, Louisville, Kentucky, in obtaining the test materials for PMA battery and its administration are gratefully acknowledged. Sincere appreciation is due to Dr. Steven G. Vandenber, Director of the Child Development Unit for his excellent cooperation and encouragement.

The testing sessions were held in class rooms which without exception provided optimal conditions for the taking of psychological tests. In addition to the investigator himself, one research assistant[3] was responsible for the administration and proctoring of the tests. The raw scores on each of the above mentioned tests and the cumulative scores on five psychology examinations given to the Ss during the entire semester were used for correlational analysis. These total points were the basis for final course grades in psychology.

In the Code-Substitution Test, the Ss were required to decipher certain symbols the key for which appeared on the top of the answer sheet. This they did for seven min. After each minute the Experimenter gave them a signal and the Ss checked on the answer sheet their each minute's output. Following this, they were required to decode the same symbols but without consulting the key. Outppt for each successive-minute was recorded for five min. The entire key was then changed although the coding symbols remained the same. The task essentially called for new responses to old stimuli. Under this habit interference situation Ss were allowed to consult the new key that appeared on the top of the given answer sheet. The study terminated at the expiry of five min. during which time the Ss recorded their each minute's output. In the analysis, onlythe total output for 15 min. practice on the Code-Substitution Test has been taken into consideration.

Results

The product moment correlations between SCT and a few selected tests pf PMA are shown in Table 3.

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[3] The assistance of Steve Potts is acknowledged with thanks.

TABLE 3

Product Moment Correlation Between SCT and Selected Tests of PMA

Variable Name	Correlation with SCT
Reasoning	.086
Multiplication	.058
Memory	-.031
Verbal Classification	.063
Verbal Analogies	-.017
Punched Holes	.024
Flags	.074
Cubes	.080
Arithmetic	.087
Code Words	.018

The intercorrelations of SCT and other remaining tests of PMA, Hidden Figures, Hidden Patterns, Code Substitution Tests and Total Psychology Scores are given in Table 4 along with the mean and standard deviation of each variable.

The intercorrelation matrix obtained from deleting the columns and the corresponding rows occupied by SCT retest variable, Hidden Patterns, Hidden Figures, MAS, and Psychology Score variables was submitted to a stepwise multiple regression analysis following a program prepared by Spiegel and Bock (1963) for LGP-30. The order in which the variable enters the regression was determined *a priori* in terms of their correlations with SCT. The program computes the regression equation, the Squared Multiple Correlation and various other information at each step treating second, third, fourth, etc. variates at each step. The results of the stepwise regression analysis are presented in Table 5.

TABLE 5

Regression Coefficients, Multiple Correlation Between Various Predictor Sets and the Criterion SCT at Different Steps of Analysis

(N = 87)

Step No.	Predictor Variables	Regression Coefficient	Multiple Correlation
2	Identical Form A	.2076	.293*
	Code Substitution	.1500	
3	Identical Form A	.1935	.332*
	Code Substitution	.1338	
	Sound Groupings	.1592	
4	Identical Form A	.1697	353*
	Code Substitution	.1145	
	Sound Grouping	.1626	
	Completion	.1246	
5	Identical Form A	.1724	.365*
	Code Substitution	.0890	
	Sound Grouping	.1379	
	Completion	.1052	
	Addition	.1051	

*P < .05

Discussion

The results of the stepwise multiple regression displayed in Table 5 show that it is possible to predict the scores on SCT from only four tests of PMA, namely, Identical Form,Sound Grouping, Completion and Addition. The scores on these tests for the High *n* Ach group were found significantly higher than the low *n* Ach group (both classified on the basis of the total raw scores received on SCT). A Discriminant Function Analysis also revealed that the above tests played most important role in discriminating between high and low *n* Ach groups compared to other tests of PMA. These findings do not necessarily reflect high intelligence on the part of the high *n* Ach group. It may be interpreted merely as a greater effort on the part of the high *n* Ach group to excel others. This conclusion is based on the fact that SCT has very low correlation with cumulative scores on Psychology examinations, a number of tests of PMA which measure some aspects of intelligence as can be seen from Table 3. Most of these tests correlating high with SCT are very simple in nature and do not really call for complex abilities or skills. Because of the nature of these tests, it is therefore possible for the *S*s of the high *n* Ach group to excel others simply by virtue of their effort and motivation in a testing situation where presumably "sense of achievement" is the only factor acting as an incentive.

The main reason for including MAS in the test battery was to verify if SCT and MAS are measuring two interrelated drive states or two aspects of the same general drive state. The lack of relationship between the two tests suggests that SCT may not be measuring defensive fear of failure which according to McClelland (1951) is one of the characteristics of low achievement group and is responsible for the negative correlation between

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n Ach scores based on fantasy and Taylor's MAS (Raphelson, 1957; Kausler and Trapp, 1958). It seems then that the items of SCT are more concerned with "hope of success" rather than "fear of failure".

CHAPTER IV

RELIABILITY STUDIES

In the studies reported in this chapter, SCT data were gathered to answer the following and other questions:

1. How consistent are the SCT scores over varying periods of time? An evaluation of the test-retest reliability of the SCT is necessary. If the test is to be used as a counseling tool, it must measure relatively stable personality characteristics rather than temporary moods or reactive states. If the test is to be used in research, the relationship of SCT scores to other variables may depend on the reliability of the SCT, particularly when the SCT has been administered at a time different from that when the other variables were measured.

2. What are the effects of previously having taken the SCT on retest performance? If SCT scores are to be used as a measure of change in values, the effect of the original test performance on retest performance should be known.

3. How internally consistent are the various items of SCT? This was determined by calculating Kuder-Richardson (1937) reliability coefficient using their formula 20. "Such a reliability coefficient provides a measure of both equivalence (as in split-half methods) and homogeneity. Thus two tests that have equally high reliability in terms of equivalent form or split-half coefficients, may vary in their coefficients of inter-item consistency, if they differ in the degree of homogeneity of their items. In fact, the difference between split-half and inter-item consistency coefficients could be used as an index of heterogeneity of the test items." (Anastasi, 1961, p.122).

4. What is the split-half reliability of SCT? Scores on the odd and even items were correlated to answer this question.

Subjects

A. Test-Retest Reliability

Data obtained from two different samples were used to obtain the test-retest reliabilities. Both these samples (Sample 2 and Sample 3) are described in Chapter III, under Section A. In Sample 2, there were 87 Ss. Only 58 Ss served as the Ss for Sample 3.

In addition to these two groups, test-retest data were available from 71 students who were enrolled in an introductory psychology course at the Southeastern Campus of Indiana University during Summer 1963 semester. The number of male and female students was equally divided. Only a few of them were freshmen. More than half of them came from different colleges and universities with at least one year experience.

Procedure

Ss of Sample 2 completed the SCT at their leisure time soon after the semester started. After approximately two months, they were given again the SCT to take home as before and fill it out in their leisure time. They were asked to turn in the completed answer sheet along with the test within a week. Almost 91 per cent students turned in the answer sheets within the time limit.

In the case of Sample 3 which was more heterogeneous in nature compared to Sample 2, the SCT was administered during regularly scheduled class period under a liberal time limit. The group received the test again after nearly 45 days and during classroom hours the test was given under a liberal time limit.

All students of Sample 4 originally had been tested on the second meeting of the class. They took the SCT under a liberal time limit during the regularly scheduled class period. They were tested again after nearly three months under similar conditions to obtain the retest data.

Results

Table 6 summarizes the test-retest reliability data for the various groups.

TABLE 6

Test-Retest Reliability Coefficients and Summary of the Condition under which they were obtained.

Sample No.	Sample Size	Sample Description	Testing Condition	Test-Retest Interval	Test-retest Reliability
2	87	Freshmen in Introductory Psych. Course during Fall 1963 semester.	Took the test at home and filled it out.	Nearly 2 months.	.71
3	58	Mixed. Most of them enrolled in Junior level Abnormal Psych Course during Spring 1964 semester.	Took the test under liberal time limit condition in class.	Nearly 45 days.	.83
4	71	Mixed. Enrolled in Introd. psych. course during Summer 1963 semester.	Same as above.	Nearly 3 months.	.75

Discussion

The obtained coefficients shown in Table 6 are not very high; still they are quite satisfactory compared to the reliabilities reported for the n Ach scores derived from fantasy material. For both Samples 2 and 4, the coefficients are not as high as it should be for a self-reported inventory. When a search was made as to the plausible reason, it turned out that in both cases the coefficients were deflated because of "restriction of range" (Thorndike, 1949). Since Ss in Sample 3 were more heterogeneous in population characteristics than the Ss of other samples, the greater range for the former sample was no surprise. It seems then that if some correction is made for group homogeneity, the values of the corrected reliability coefficients for Samples 2 and 4 will be comparable to the reliability obtained for Sample 3.

In any case, all the uncorrected reliability coefficients are significant at .001 level indicating that SCT scores reflect more than momentary moods or reactive states. The coefficients also indicate that, if the SCT is to be used for experimental problems, there should be no more than one month's lapse between SCT administration and the measurement of other variables to be correlated with SCT performance.

B. Test-retest Effects

Table 7 gives the test-retest data separately for all the three samples tested.

TABLE 7

Descriptive Statistics derived from the Test-retest SCT Scores

Sample No.	Original test Range	Mean	SD	Retest Range	Mean	SD	Difference between Means	t
2	7-25	15.46	4.88	4-29	15.91	5.65	+ .45	.067
3	6-39	16.53	5.94	8-39	17.25	6.96	+ .72	.259
4	6-30	16.82	5.09	4-36	16.73	6.38	- .09	.016

As can be seen from Table 7, the mean test-retest differences did not differ significantly from zero. All the t values obtained following the difference method turned out to be insignificant. An analysis of variance was also run to see if the three groups differed significantly from each other in terms of their original scores as well as retest scores. An F of 0.91 was obtained for the original scores which for 3 and 212 degrees of freedom is significant not even at .10 level. Similar result was obtained for the retest scores. The variances of the three groups were similarly not very different from one group to another. Bartlett's (1937) test of homogeneity of variance resulted in a Q/l of .93 which following χ^2 distribution for 2 df. is insignificant. Similar results were obtained in testing the difference between the variance of three independent samples. The results of retesting therefore, are clearly indicative of no consistent pattern of difference from original test performance.

C. Consistency and Split-half Reliabilities

The data obtained from 248 Ss who belonged to Sample 1 were analyzed to obtain Kuder-Richardson Internal Consistency reliability as well as split-half (odd-even) reliability. The original test scores for 71 Ss of Sample 4 were also treated for the same purposes. In each case, the reliability coefficient obtained from Kuder-Richardson (K-R 20) formula was checked following Hoyt's (1941) analysis of variance (ANOVA) procedure of estimating reliability. The results of ANOVA are also reported here.

Results

The obtained reliability coefficients for the two samples are reported in Table 8.

TABLE 8

Internal Consistency and Split-half Reliability Coefficients

Sample No.	N	Method of Estimation	SCT score	Reliability Estimate
1	248	K-R (20)	Original	.716
1	248	Odd-even reliability (without correction)	Original	.612
4	71	K-R (20)	Original	.654
4	71	Odd-even reliability (without correction)	Original	.544
4	71	K-R (20)	Retest	.789
4	71	Odd-even reliability (without correction)	Retest	.781

The results of three separate ANOVAs are summarized in Table 9.

TABLE 9

Solution for the Variances in SCT scores (original and retest) preparatory to Estimation of Reliability for Two Samples

Sources of variation	Sample 1(original)			Sample 4(original)			Sample 4(Retest)	
	df	MS	F	df	MS	F	MS	F
Examinees	247	.636	3.51*	70	.513	2.866*	.839	4.767*
Items	49	8.432	46.58**	49	2.816	15.731**	2.622	14.897**
Remainder	12,101	.181		3428	.179		.176	

$P < .01$ $**P < .001$

Discussion

The "coefficients of internal consistency" (Cureton, 1958) reported above are reasonably satisfactory. The small error variances reported in Table 9 also suggest that the SCT is relatively free from errors associated with sampling in the item universe. It may also be noted that the error variances have not changed much from sample to sample or from the original testing to retesting in the case of Sample 4. The source of variation in all cases are, however, more accountable in terms of item differences rather than inter-individual variability. This strongly suggests that the different items are not measuring the same traits. This possibility will be investigated in detail in Chapter VI on Factor Analysis.

A comparison of K-R (20) reliability and Odd-even reliability indicates that in all three cases, the coefficient is lower for the odd-even reliability than the K-R (20) reliability. Usually, the split-half coefficients are a little higher than the K-R (20) reliability. This, however, is not true when items are highly homogeneous. In any case, the discrepancy between the two types of coefficients as obtained in the present study suggests that the items of SCT are not highly homogeneous.

CHAPTER V

VALIDITY STUDIES

Four studies will be reported in this chapter all of which are concerned with the validity of Sentence Completion Test as a measure of achievement motivation. The first study deals with the congruent validity of SCT. Essentially, it investigates the relationship between SCT and a number of other scales the items of which were borrowed from Murray's (1938) need questionnaires. In the remaining studies, an attempt was made to predict behavior under various conditions where achievement motivation is assumed to be involved. In the first construct validity study, the aim was to predict how the self ratings of high and low n Ach subjects classified on the basis of total raw scores received on SCT will show patterns of differentiation. In the second construct validity study, prediction was made of a differential rate of performance on the part of high and low n Ach groups when working on a simple task such as checking the identical figures that appear in a row. In the third study, designed in the framework of a level of aspiration test an attempt has been made to predict the goal setting behavior of college students from their scores on SCT. For this investigation, the criterion for the level of aspiration was the level of performance in three psychology quizes which the students undertook to reach.

A. Congruent Validity Study

The main purpose of this study was to study the correlations between SCT scores and scores on several of Murray's (1938) manifest needs such as n Ach, ego ideal, autonomy, intensity and need counteraction. All these manifest needs were measured by using 40 items questionnaire appearing under the disguised title Personality Inventory. The hypothesis which was verified in this study was that there is a significant correlation between SCT and all manifest needs listed above except need intensity.

A secondary purpose of this correlational study was to demonstrate the superiority of the proposed forced-choice measure of n Ach over the self-report measure of n Ach by asking Ss whether or not he agrees with a few items reflecting the sentiments and feelings of high achievement motivation.

Subjects

All 58 Ss of Sample 3 described on page14 participated in this study.

Instrument

In addition to SCT, all Ss filled out a questionnaire entitled Personality Inventory, a copy of which is enclosed under Appendix C. In the n Ach scale, all eight items used by deCharms, Morrison et al (1955) as a measure of v Achievement, which they borrowed from Murray (1938,p.165) were incorporated in addition to nine other items. The other scales pertain to Ego Ideal (7 items), Autonomy (5 items), Intensity (5 items) and Need Counteraction (6 items). The items of the Intensity scale appeared first in the Inventory. It was thought that they would work as "shock absorbers." Scores for each of these scales were obtained just by summing the relevant items to which S positively responded.

Procedure

All the questionnaires including SCT were administered to the group during regularly scheduled class period under a liberal time limit. The Ss were specially instructed to be honest and frank in expressing their opinions. After nearly 45 days, these questionnaires were given under similar conditions to obtain the retest data.

Results

The intercorrelation matrix of the five scales of the Personality Inventory and the SCT can be seen in Table 10 along with the relevant descriptive statistics for each of the variables.

TABLE 10

Product Moment Intercorrelations* Among Scales of Personality Inventory and Sentence Completion Test
(N = 58)

Variable	SCT	n Ach	Ego Ideal	Autonomy	Intensity	Need Counteraction
SCT	(0.826)	.439	.393	.318	.206	.394
n Ach	.439	(0.520)	.345	.229	.201	.286
Ego Ideal	.393	.346	(0.520)	.253	.210	.273
Autonomy	.318	.229	.253	(0.410)	.055	.233
Intensity	.206	.201	.210	.055	(0.390)	.142
Need Counter	.394	.286	.273	.233	.142	(0.420)
Mean	16.53	7.16	2.71	2.12	3.64	3.50
S.D.	5.939	2.323	1.325	1.415	1.252	1.625

*The entries in the diagonal are the test-retest reliabilities.

Discussion

The study demonstrates the congruent validity of SCT since both the n Ach and Ego-Ideal subscales show a high correlation with SCT significant beyond .01 level. The correlation between SCT and Need Counteraction is also statistically significant. The findings suggest that a consciously high desire to achievement tends to be associated with a high standard of excellence, an effort to maintain self respect and pride on a high level and a zest for restriving in order to make up for failures as was hypothesized. The results are perfectly in line with the expectation of Murray (1938) that the items for Ego Ideal Scale reflect the fantasies "which portray the subjects, or a hero, accomplishing great deeds or achieving recognition. These are the desiderata of the need for achievement"(Murray, 1938, p.166).

The high correlation between SCT and the n Ach scale indicates that both scales are measuring consciously recognized achievement motivation which deCharms, Morrison et al (1955) have referred to as v for "valuing" achievement. The above investigators found that while n Ach scores based on content analysis of fantasies were positively related to memory and performance, v Ach scores were not related to these measures but were related to the tendency of Ss to be influenced by the opinions of experts in an ambiguous situation. It has been suggested that "those who do verbalize their achievement desires may have developed such needs somewhat later in life, possibly in response to adult pressures for becoming successful: (deCharms, Morrison et al, McClelland, 1955, p.415).

However, a comparison of the correlations between SCT and other manifest need variables, with the corresponding correlation observed between n Ach scale and the need variables indicates that the correlations for the former are appreciably higher in all cases excepting intensity. Moreover, the test-retest reliability of the 17-item n Ach scale does not appear to be as satisfactory as the SCT.

We therefore, can not treat the n Ach scale of Personality Inventory and the SCT as alternative measures of achievement motivation.

B. Prediction of Self Concept

In order to establish the construct validity of SCT, an experiment was designed to test the hypothesis that if the score on SCT is an index of the strength of the achievement motive in individuals, we should be able to demonstrate that other conditions being equal, people with high n Ach scores as measured by SCT, rate themselves higher on different dimensions of personality than persons with low n Ach scores. Such a prediction was made on the basis of the results of Weinberger's (1951) study which suggested that Ss having a strong generalized motivation tends to rate achievement related traits as important more frequently than Ss having low achievement motivation.

Subjects

The Ss for this study were the 87 students of Sample 2 who are described in detail on page 14.

Procedure

All Ss were given to rate themselves on a nine-point scale with regard to 30 descriptive statements appearing under the title Self Insight Test, a copy of which is enclosed in Appendix D. These statements pertain to seven dimensions of the self image, namely, (1) Sociability, (2) Perseverance, (3) Leadership, (4) Flexibility, (5) Perfection, (6) Intellectual Ability, and (7) Emotional Stability. The ratings were made approximately two months from the date Ss filled out the SCT. In almost 15 min. before the class started, most of them could complete the rating form. In analyzing the data, a significant departure was made from the traditional ways. Instead of deriving a single composite index of self rating from the linear combinations of several ratings and then using either a t or F test, a multivariate test of equality of mean vectors (MANOVA) was applied to the rating data using a program prepared by Bock (1963) for UNIVAC 1105 after the subjects have been categorized into two groups, high and low, based on the total SCT scores. There was a further subdivision of the groups in terms of sex in order to test the null hypothesis that the various groups classified in terms of SCT scores and sex do not differ significantly from each other with regard to their self ratings.

Results

The means for the high and low n Ach groups appear in Table 11 for all the variables including the SCT scores. Table 11 displays the inter-correlations among the variables. The figures in the diagonal of the inter correlation matrix are the test-retest reliability coefficients based on the retest data obtained after almost two months from 40 Ss from a separate but comparable sample. The results of MANOVA (2x2 design) clearly indicate that there is no sex difference with regard to self ratings. The likelihood ratio criterion (Wilks, 1932) for the achievement motivation effect, which when transformed into the $\chi 2$ statistic suggests that the result is not very clear cut although it is in the expected direction. The $\chi 2$ computed turned out to be 14.133 which for 7 d.f. just reaches the .05 significance level. The $\chi 2$ for the interaction failed to reach even the .10 significance level as was expected. The MANOVA program also handles simultaneously separate univariate analysis of variance (ANOVA) and Roy-Bargmann (1958) step-down analysis of variance. The obtained results of ANOVA displayed in Table 12, indicate that Ss in the high n Ach group rate themselves lower in Intellectual Abilities and higher in Perseverance than Ss in the low n Ach group. The step-down analysis reveals interestingly that when individual differences with regard to all other self ratings are statistically held constant, the high n Ach group's mean rating on emotional stability dimension becomes significantly greater than the low n Ach group. The differences between the two groups on other self ratings are not significant.

TABLE 6

Product Moment Intercorrelations Among Measures of Self Perception and Sentence Completion Test & other Descriptive Statatics

(N = 87)

Variable	SCT	Soc.	Persev.	Perfn.	Intell.	Lead	Flex.	Emotn.
SCT	(.710)	-.124	.144	.096	-.273	-.090	-.136	.078
Sociability	-.124	(.756)	.418	.225	.614	.526	.574	.273
Perseverance	.144	.418	(.786)	.365	.575	.658	.235	.261
Perfection	.096	.225	.365	(.644)	.396	.385	.126	.044
Intelligence	-.273	.614	.575	.396	(.604)	.630	.460	.340
Leadership	-.090	.526	.658	.385	.630	(.625)	.202	.194
Flexibility	-.136	.574	.235	.126	.460	.202	(.406)	.348
Emotional Stab.	.078	.273	.261	.044	.340	.194	.348	(.336)
No. of items	50	6	4	4	5	5	4	2
Mean High n Ach	19.42	34.38	24.11	23.30	32.05	30.75	20.50	8.14
Mean Low n Ach	11.59	36.24	22.47	22.54	33.10	29.82	21.49	7.27
Stand Devn.	4.88	6.57	5.21	7.80	5.08	7.43	3.77	1.86

TABLE 12

Summary of Separate ANOVA of each Measure of Self Perceptiion

S.V.	df	Sociab.		Persever.		Perfect.		Intellig.		Leader.		Flexib.		Em.	Stab.
		MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F
n Ach	1	89.70	2.19	114.38	3.98*	1.49	.70	88.85	2.95	19.34	.30	24.76	.54	25.92	1.5
Sex	1	12.12	.29	21.55	.75	4.67	2.22	30.72	1.02	78.55	1.22	98.18	2.14	22.33	1.51
Interaction	1	14.86	.363	5.46	.19	2.63	1.25	1.50	0.05	26.29	.41	14.51	.31	9.73	.66
Error	83	40.95		28.74		21.02		30.12		64.51		45.92		14.77	

* $P < .05$

Discussion

Although the study does not demonstrate a clear cut difference between the high and low n Ach groups with regard to their responses in self ratings, it suggests certain interesting patterns of differentiation between the behavior of the two groups. The high n Ach group was found to have a higher self rating on the Perseverance dimension and a lower rating on the Intellectual Ability dimension compared to the low n Ach groups. The low n Ach group also had slightly higher ratings on sociability and flexibility dimensions although these differences were statistically not significant.

The negative correlation between SCT and ratings of intellectual ability is interpreted to mean that people with high achievement motive might have developed high standard of excellence with regard to intellectual abilities because of the great demands made on them during childhood (McClelland, 1951). When they compare their own intelligence with the personal standard they have set, the discrepancy between self and the ego-ideal becomes obvious. This results in a lower rating of their intelligence than the low n Ach group. This interpretation is in line with the results obtained by Martire (1956) and Ricciuti and Schultz (1958).

The study, therefore, suggests that instead of finding an overall higher self image on the part of the high n Ach group, attempts should be made to find those achievement related dimensions of personality where the high n Ach group stands lower and those traits where they stand higher compared to the low n Ach group, when self ratings are obtained from both the groups.

C. Relationship Between n Ach & Performance

In order to establish the construct validity of SCT, an experiment was designed to test the hypothesis that if the score on SCT is an index of the strength of the achievement motive in individuals, we should be able to demonstrate that other conditions being equal, people with high n Ach scores show evidence of better performance in simple learning tasks (Lowell, 1952; McClelland, 1955). If Ss with high n Ach scores perform the given task at a relatively faster rate than the Ss of low n Ach group for no other apparent reasons, then it may be reasonably concluded that the achievement motive has been reflected in their performance. If on the top of this, the high n Ach group shows faster learning on the given task task than the low n Ach group, then we can be still more sure of our conclusion. We are here reminded of Miller's (1951) statement that the decisive criterion for determining whether a motive is involved in learning is whether or not it can produce learning.

Subjects

The 80 Ss who participated in this study belonged to Sample 2 described on page 14. There were 45 males and 35 females in this sample. Their motivation to participate appeared to be satisfactory for all of them were volunteers.

Instrument

In addition to SCT, the Ss were given the Thurstone and Jeffrey (1956) Test of Perceptual Speed Form A (Identical Forms). The test essentially measures "speed of perception" and calls for a very simple skill. This task was chosen as the criterion because of its simplicity and novelity.

Procedure

All *S*s practiced on the Test of Perceptual Speed for exactly ten minutes nearly one month after they took SCT. The test was administered in groups of 40 students at a time during regular class hours. The output of each minute's work was recorded by the *S* himself by checking over the problem he was working on at the moment a signal was given at the expiration of each minute. The 80 *S*s who worked on this task were classified into two groups, 40 in each, based on their total raw scores on SCT. Those who scored 16 or above in SCT were placed in High *n* Ach group whereas those scoring 15 or less formed the low *n* Ach group.

Results

Figure 1 summarizes how groups of subjects with high and low scores on SCT performed in the successive minutes practice on the Perceptual Speed Test. The obvious conclusion to be drawn from the curves of the two groups is that the high *n* Ach group shows consistently a better performance than the low *n* Ach group although in the beginning both the groups started from more or less the same level of proficiency. The former group also shows evidence of increasing output with successive practice whereas the low *n* Ach group does not. Several tests of significance can be made to document this trend but since the successive measures are correlated such statistical tests will be erroneous. The best known solution for such problems is to use Hotelling's (1931) test of equality of mean vectors for two groups which is a multivariate analogue of the classical *t* test. The statistic computed for the test is Hotelling's T^2 which obeys the *F* distribution. The computational procedure is illustrated in Winer (1963, p. 633). The T^2 for the data turned out to be 28.61 which when transformed to the *F* statistic revealed that the overall difference between the two groups was statistically significant at the .02 level ($F=2.47$for 10 and 69 df

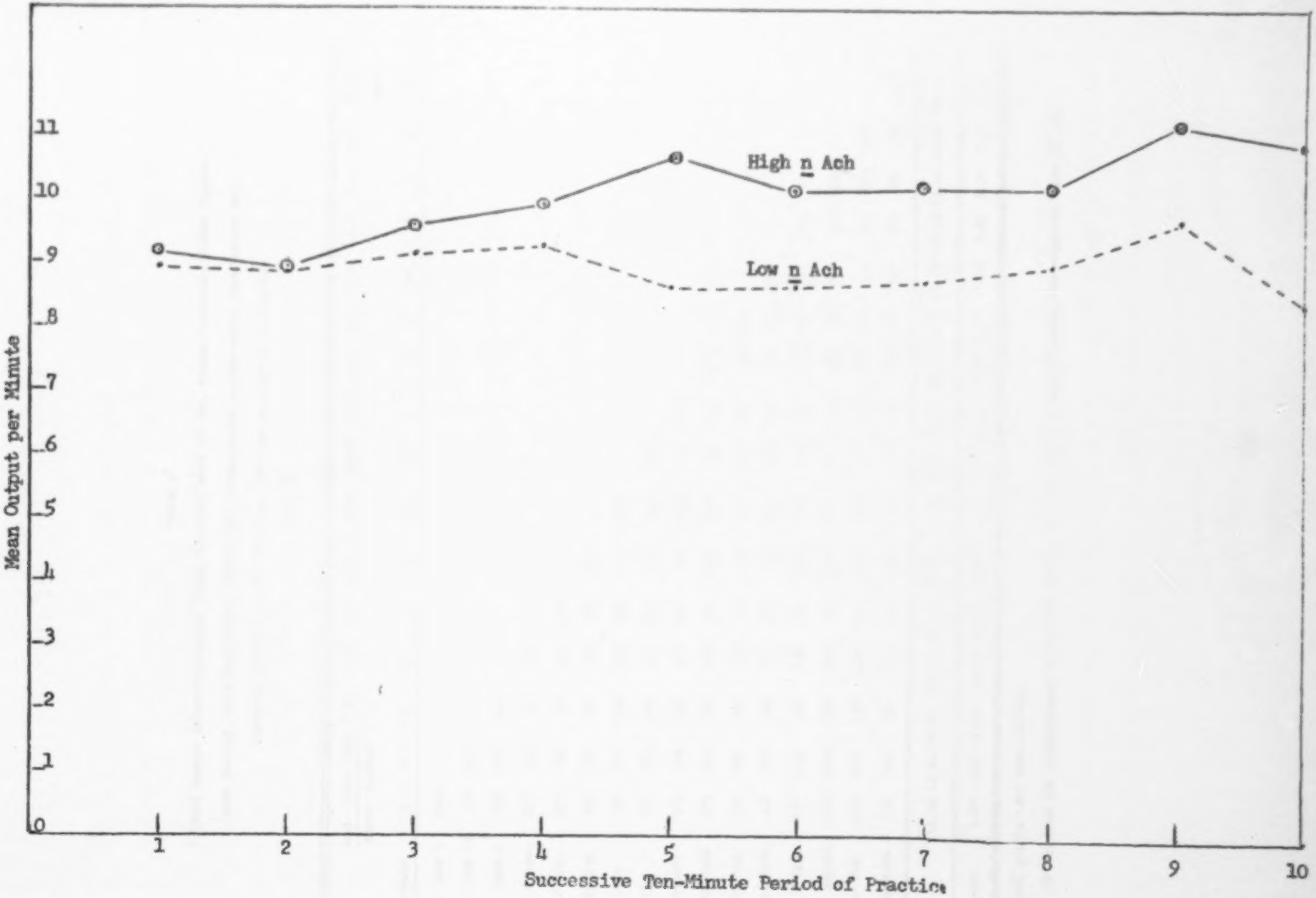
Mean Output per Minute
11
10
9
8
7
6
5
4
3
2
1
0
High n Ach
Low n Ach
1
2
3
4
5
6
7
8
9
10
Successive Ten-Minute Period of Practice

TABLE 1†

Product Moment Intercorrelations* Among Selected Tests of PMA, Hidden Patterns, Hidden Figures, Word Endings, Word Beginnings, Taylor MAS, Total Scores on Psychology Examination and Sentence Completion Test together with the Descriptive Statistics

(N = 87)

	Sent. Comp. Test		I.F.	C.S.	S.G.	Compln.	Addn.	Readg.	Vocub.	N.C.	H.F.	H.P.	W.E.	W.B.	MAS	Total
	First	Second														Psych.
Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Sent Comp I	1000															
Sent Comp II	710	1000														
Iden Form A	256	086	1000													
Code Subsn.	217	140	323	1000												
Sound Gpg.	215	099	125	304	1000											
Completion	200	253	121	130	266	1000										
Addition	192	071	238	213	234	016	1000									
Reading	177	298	044	089	465	448	036	1000								
Vocabulary	172	240	185	076	463	545	-001	598	1000							
Number Code	174	162	144	228	274	184	405	197	140	1000						
Hidden Fig.	120	084	365	100	153	200	117	248	203	128	1000					
Hidden Patn.	-100	036	190	010	006	061	-020	-004	106	186	406	1000				
Word Endgs.	007	-002	116	238	556	269	240	314	339	355	237	160	1000			
Word Begngs.	-066	-048	142	352	312	287	129	233	317	302	269	288	548	1000		
Taylor MAS	-095	-075	174	-180	-061	-079	078	104	-024	-164	078	017	004	065	1000	
PsychoScore	116	107	170	153	503	422	077	483	631	109	127	084	421	280	096	1000
Mean	15.46	15.91	96.61	270.70	49.13	21.82	7.32	25.61	40.63	23.37	9.00	106.30	28.43	23.01	15.92	332.76
St. Devn.	4.88	5.65	21.03	43.18	12.49	5.88	3.18	7.76	11.51	7.78	4.07	24.13	7.62	6.05	7.13	55.01

†Decimal points have been omitted.

*r = .28 required for significance at the .01 level. For .05 level of significance, the required value is .21.

As a further check on the conclusion, the increase in the output from the first to the last trial on the Perceptual Speed was correlated with the SCT scores as well as a few selected tests of Primary Mental Abilities, such as Sound Grouping which is supposed to be a measure of perceptual (auditory) speed and Reasoning in order to partial out the effect of ability factors. The results of this analysis are as follows:

Product moment correlation between Output Increase and SCT = .42 = r_{12}

Product moment correlation between Output Increase and Sound Grouping = .11 = r_{13}

Product moment correlation between Output Increase and Reasoning = .09 = r_{14}

Product moment correlation between SCT and Sount Grouping = .20 = r_{23}

Product moment correlation between SCT and Reasoning = .08 = r_{24}

$r_{12.3}$ = .408 $r_{12.4}$ = .415

Thus it can be seen from the above partial correlations that even with the effects of reasoning or similar ability held constant, there is a significant relationship (p = .01) relationship between n Ach as measured by SCT and increase in the output on Perceptual Speed Test. Partial correlation was also run in order to eliminate the effect of general drive level as measured by Taylor's MAS, but since the correlation between SCT and MAS is only -.095, the decrease in the magnitude of r_{12} was almost zero.

Discussion

The study demonstrates that although two motivational groups started out about equal on the Perceptual Speed Test, with gradual practice the one with higher motivation pulls ahead. The effect of motivation can be seen right from the third trial and it remains intact till the termination of the practice period. The results thus clearly indicate that Ss with high SCT scores improves their performance more rapidly than Ss with low SCT scores even when ability factor is held constant. The data strongly suggest that some sort of learning occurred in the case of the high scores while for the low scorers the variations in the successive minutes output display no consistent trend. The prediction we made is therefore confirmed: there is definite and statistically significant evidence for superior performance and more clear indication of learning in the high as compared with the low n Ach group.

The study therefore, can be considered as a positive evidence in favor of the construct validity of SCT.

D. Achievement Motivation and Goal-setting Behavior

In recent years, the relationship between achievement motivation (n Ach) and goal setting behavior has been studied for a number of non-learning tasks by McClelland and his associates (McClelland *et al*, 1953, p. 242-248; Atkinson and Reitman, 1956; Atkinson, 1950; Atkinson, 1958, p. 288-305; Clark, Teevan and Ricciuti, 1956). More recently, the relationship between them has also been studied in a learning situation (Kausler and Trapp, 1958; Ricciuti and Schultz, 1958). Most of these studies show that people with strong generalized achievement motivation usually set higher goals than those with low n achievement, particularly when the reality determinant in the level of aspiration situation is unstructured. In the present study, the same hypothesis has been tested in order to establish the construct validity of the *Sentence Completion Test*.

The study primarily involved a comparison between Ss with high scores on SCT and Ss with low scores on SCT, with regard to the level of performance in three psychology examinations which they explicitly undertook to reach. It was the purpose of the study to test the null hypothesis that there is no difference between the goal setting behavior of the high n Ach group and low n Ach group. More specifically, the experimental hypotheses investigated in this study were: (a) Ss with high scores on SCT will show more positive "goal discrepancy scores" (Eysenck and Himmelweit, 1946) than Ss with low scores on SCT, (b) the difference between the two groups in terms of goal discrepancy scores will be more clear cut on the first trial (session) of goal setting than the subsequent ones when Ss are aware of their progress, (c) Ss scoring high on SCT will tend to raise their aspiration level when their actual performance is relatively poor. Those performing well, on the other hand, will show a positive but a relatively lower goal discrepancy score compared to the poor performers. Such an inverse relationship between goal discrepancy score and actual performance will be found only in the high n Ach group and not in the low n Ach group, and (d) in terms of "Judgment Discrepancy Scores" (Eysenck, 1952), Ss with high SCT scores will score lower than Ss with low score on SCT.

The last hypothesis is borne out of the observation that people with high achievement motivation tend to rate themselves low in some achievement related traits, such as intelligence (Martire, 1956; Ricciuti and Schultz, 1958). They seem to be dissatisfied with their performance and therefore express their judgment regarding their achievement in a more restrained manner. If this is true, then it seems conceivable that Ss scoring high on SCT will have high level of aspiration (high positive goal discrepancy score) and will tend to underestimate their past performance (high negative judgment discrepancy score). Thus, the correlation between goal and judgment discrepancy scores is expected to be negative in the case of high n Ach group. No such predictive statement can be made regarding the low n Ach group.

In addition to the goal discrepancy and judgment discrepancy scores, the present study also employed the Zelen (1955) rigidity index which consisted of an additive combination of the total number of shifts during the experimental period with the absolute total number of shifts. The higher the score on this index, the more flexible the individual is in his goal setting behavior. The measure was solely utilized to investigate if n Ach has any relationship with flexibility in a level of aspiration situation.

Subjects

The Ss were 43 male and 42 female students (Sample 5) in two sections of an introductory psychology course at the Southeastern Campus of Indiana University, Jeffersonville, Indiana, during the fall 1962 semester. Almost 95 per cent of them were freshmen. Their ages ranged between 18 and 22 years.

Procedure

The Sentence Completion Test was used to classify Ss in two criterion groups. The Ss of the present study took the SCT during the regular class periods two weeks before the level of aspiration study began. They were told that the purpose of testing was to obtain certain information regarding the uniqueness of their behavior which could be used for the purpose of counseling. The 43 Ss scoring 17 or above on the SCT were arbitrarily designated as the high n Ach group; and the remaining 42 Ss having scores less than 17 formed the low n Ach group.

The entire study was conducted in the regular class hours. It continued almost over two and half months. During this period, all Ss had three psychology quizes as part of their regular evaluation. The total score in each of these quizes was 100. All the quizes consisted of multiple choice and matching exercises. Immediately before the scores of each S was announced in the classroom, he was required to fill out a small questionnaire. The questionnaire among other things included the following items:

1. What score you had in the last psychology quiz?
2. How satisfied are you with your performance in the last psychology quiz?
3. Estimate what would be your score this time.

After the Ss filled out the questionnaire and score of each student was announced publicly in the classroom, they were given the following instructions:

"On the next quiz that you are going to take after three weeks, the maximum score will be 100 as usual. Please state in writing at the bottom of the questionnaire what score you expect to make on the next examination. Your answer should be in terms of percentage and not letter grade".

The same procedure was followed in the second and third sessions of the experiment. Before each feed back, the Ss estimated the scores they were going to receive and after the feed back, they indicated their next level of performance on the psychology examination.

From the estimated and aspired scores, goal discrepancy, judgment discrepancy and flexibility scores were derived for Ss of high and Ss of low n Ach groups. These scores were then subjected to a multivariate analysis of variance for testing the equality of mean vectors[1]. In one analysis all the seven measures were used. In another, only three goal discrepancy measures, one obtained for each level of aspiration situation, were used. Intercorrelations among all these seven measures of goal setting together with the actual scores on three psychology quizes were computed separately both high n Ach and low n Ach groups. In order to further determine to what extent groups of high and low n Ach subjects can be differentiated in terms of their profiles provided by seven level of aspiration measures, Fisher's (1936) Discriminant Function Analysis was applied to the obtained data. This was also done separately for the three goal discrepancy scores for testing our second hypothesis.

Results

Figure 2 shows the means for both the groups in estimating their pshchology scores, in recalling their previous scores and in setting their next goals, all in terms of percentage.

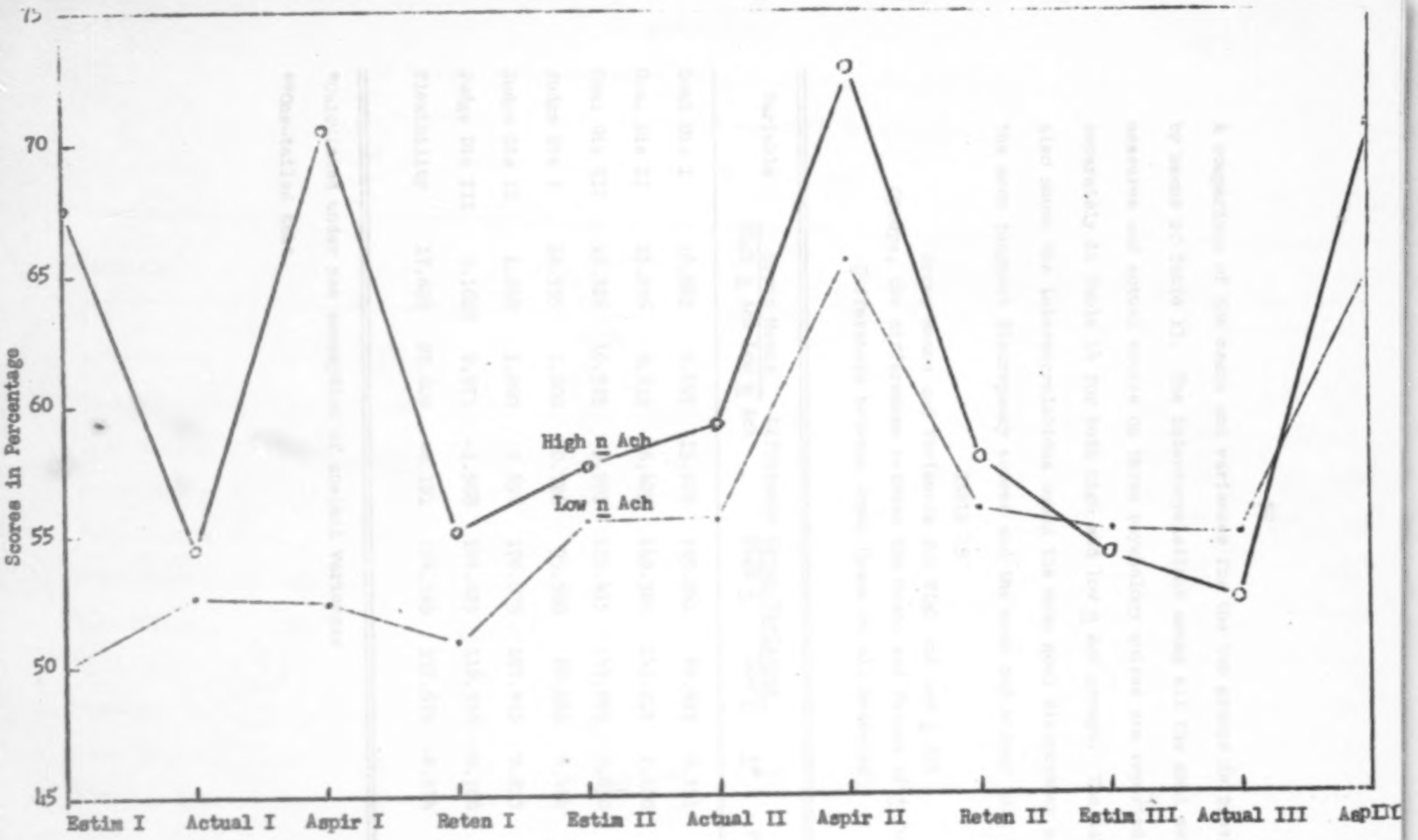

Fig. 2 showing the estimated, actual and aspired scores for High and Low n Ach Groups

A comparison of the means and variances for the two groups is provided by means of Table 13. The intercorrelations among all the goal setting measures and actual scores on three psychology quizes are reported separately in Table 14 for both high and low *n* Ach groups. The table also shows the intercorrelations among the mean goal discrepancy scores, the mean judgment discrepancy scores and the mean psychology quiz scores.

TABLE 13

Group Means and Variances for High and Low *n* Ach
Groups, the differences between the Means and Values of *t* for
Differences between Group Means on all Measures

Variable	Group Means		Difference	Group Variances		*t**	Prob.**
	High *n* Ach	Low *n* Ach		High *n*	Low *n*		
Goal Dis I	16.023	2.095	13.928	135.261	69.893	6.351	.0002
Goal Dis II	15.256	8.833	6.423	149.385	243.215	2.110	.0250
Goal Dis III	19.326	10.333	9.993	175.415	147.203	3.630	.0004
Judge Dis I	12.535	1.809	10.726	95.588	68.060	5.474	.0003
Judge Dis II	1.698	1.000	0.698	176.073	197.415	0.235	
Judge Dis III	0.1628	2.071	-1.908	144.425	118.556	-0.768	
Flexibility	17.628	25.809	-8.181	164.143	337.670	-2.374	.0100

*Calculated under the assumption of unequal variances

**One-tailed test.

TABLE 14

Product Moment Intercorrelations* Among Level of Aspiration Measures and Actual Scores on Psychology Quizes shown separately for High and Low n Achivement groups

Variable	GD I 1	GD II 2	GD III 3	JD I 4	JD II 5	JD III 6	Flexib. 7	Psychology Quiz Score First 8	 Second 9	 Third 10	Mean GD 11	Mean LD 12	Tot Psy 13
Goal Discrep I	1.000	.378	.328	.776	-.053	-.040	-.035	-.519	-.310	-.341	.750	.307	-.416
Goal Discrep II	.318	1.000	.265	.220	.450	.182	.212	-.322	-.486	-.244	.733	.494	-.371
Goal Discrep III	.484	.404	1.000	.121	.268	.222	.355	-.395	-.288	-.577	.739	.355	-.456
Judge Discrep I	.550	.367	.322	1.000	-.212	.009	.040	-.481	-.241	-.231	.485	.339	-.336
Judge Discrep II	-.115	.351	.073	-.120	1.000	.227	.009	-.100	-.346	-.232	.307	.667	-.243
Judge Discrep III	.034	.185	.181	-.117	.349	1.000	.456	-.194	-.286	-.318	.171	.724	-.287
Flexibility	.089	.699	.191	.349	.275	.111	1.000	-.256	-.242	-.373	.251	.287	-.314
Psych Quiz I	-.165	-.196	-.226	-.269	-.159	-.127	-.176	1.000	.825	.809	-.554	-.401	.937
Psych Quiz II	.024	-.253	-.191	-.067	-.324	-.275	-.009	.711	1.000	.791	-.487	-.497	.930
Psych Quiz III	-.052	-.181	-.306	-.134	-.262	-.265	-.045	.745	.849	1.000	-.531	-.439	.933
Mean Goal Discr.	.680	.822	.798	.505	.191	.191	.496	-.255	-.215	-.247	1.000	.521	-.561
Mean Judge Discr.	.156	.475	.269	.252	.802	.705	.378	-.277	-.385	-.365	.425	1.000	-.477
Total Psych. Score	-.065	-.228	-.264	-.163	-.274	-.247	-.077	.877	.932	.947	-.259	-.375	1.000

*Correlations for the High n Ach group appear above the main diagonal; for the low group, they [illegible] main diagonal. r = .38 required for si

The multivariate test statistic computed for testing the equality of mean vactors for the high and low n Ach groups was Hotelling's (1931) T^2. The obtained T^2 was 58.809 which when converted into F statistic revealed that the overall difference between the two criterion groups was statistically significant beyond .001 level (F = 7.809 with 7 and 77 d.f.).

The discriminant function coefficients obtained for both the analyses appear in Table 15. The means and variances of the discriminant scores for both the groups are displayed separately for the two analyses together with the corresponding Mahalanobis (1936) D^2 statistics in Table 16.

TABLE 15

Discriminant Function Coefficients for each of the Variables included in two analyses

Variable	Discriminant Coefficients Analysis involving all Variables	Goal Discrep.
Goal Discrepancy I	.000634	.001549
Goal Discrepancy II	.000293	-.000046
Goal Discrepancy III	.000424	.000210
Judgment Discrepancy Score I	.001146	-----
Judgment Discrepancy Score II	.000191	-----
Judgment Discrepancy Score III	-.000080	-----
Flexibility Score	.000772	-----

It can be seen from Table 15 that the largest contribution to the discriminant function obtained with all the seven variables is provided by the first judgment discrepancy score and then the first goal discrepancy score both with positive weights. When only three goal discrepancy scores were used in the analysis, it turned out that the difference between the high and low n Ach groups in terms of Mahalanobis D^2 was significant beyond .0001 level as can be seen from Table 16. The discriminant function for this analysis reported in Table 15 also showed

TABLE 16

Mean and Variances for the Two Groups in terms of Discriminant Function Scores together with the Distance between them as found in two separate analyses

Group	Discriminant Function Analysis involving			
	All seven Measures		Goal Discrep. only	
	Mean	Variance	Mean	Variance
High n Ach Group	.02388	.0004955	.02818	.000357
Low N Ach Group	-.00953	.0003073	.00501	.000199
Mahalanobis D^2 Statistic	2.773		1.923	
F statistic	7.809		13.293	
Degrees of Freedom	(7,77)		(3,77)	

that in separating the two n Ach groups, it was the first goal discrepancy score that played the major role which directly supports our second hypothesis.

Discussion

The significant difference in the predicted direction between the high and low scorers on the SCT clearly demonstrates the construct validity of the proposed forced-choice test as a measure of achievement motivation. The marked tendency of the high group to express higher goal setting behavior as measured by the goal discrepancy scores, particularly in the first session also suggests that the relationship between achievement motivation and S's expressed expectancy of performance is clearly positive when the reality determiners of aspiration level operate in minimum. This finding is totally in accord with that of Kausler and Trapp (1938) who found that the difference between high and low n Ach groups in goal discrepancy scores tends to diminish with practice on a digit-symbol task when Ss were informed of their progress.

The intercorrelation between the mean goal discrepancy scores and the mean psychology quiz scores is -.56 for the high n Ach group. The corresponding value for the low n Ach group is only -.26 which is not significant even at .05 level. We thus find that our third hypothesis is also confirmed.

In examining the relationship between the mean judgment discrepancy scores and the mean goal discrepancy scores, we find that the correlation between the two scores are almost the same for both high and low n Ach groups. This finding in conjunction with the mean judgment discrepancy scores for the successive sessions for both groups totally discard the fourth hypothesis we advanced. However, the results do indicate that with successive feed backs, those in the high n Ach group showed a tendency to overestimate. Further studies extending over a longer period of time seem necessary to substantiate this interesting observation.

The higher flexibility score on the part of Ss scoring low in SCT seems to be another interesting finding of this study. The product moment correlation between the flexibility scores and SCT scores was found to be .296 which indicates a negative relationship between n Ach and flexibility. This finding is in accord with the negative correlation (r = .136) reported between SCT scores and self ratings on flexibility dimension. The result is interpreted to mean that people with high n Ach tend to show more determination, perseverance in the pursuit of their high goals and as such they are less flexible in terms of their shifts in stated goals.

In addition to the findings discussed above, the study demonstrates the usefulness of applying multivariate statistical techniques to the analysis of goal setting behavior. The discriminant function analysis was used in the present study not for the purpose of classifying Ss in terms of high or low n Ach but it provided a useful means of specifying the nature of differences between the two groups in terms of the various aspects of goal setting behavior that can be studied longitudinally.

Methodologically, the study supports the usefulness of the Sentence Completion Test for differentiating Ss on the n Ach variable. Since the administration time of this group forced-choice test is approximately

25 min. and its scoring is quick and objective and above all very little faking is possible in this test, it seems quite promising as a research tool.

CHAPTER VI

A FACTOR ANALYSIS OF SENTENCE COMPLETION TEST ITEMS

A. Introduction

Since the items of SCT were written to cover various aspects of the achievement need such as hope of success, high standard of excellance, sense of competition, perseverance etc., a factor-analytic study was undertaken to identify the item factor structure within the Sentence Completion Test. No external validation of the factors has been attempted in the study reported here.

A secondary purpose of the study was to compare the factor results when parallel analyses were carried out on the same data using phi coefficients and tetrachoric coefficients (r_t). It has been suggested by a number of investigators e.g. Cattell,(1952), Ferguson (1941), Wherry and Gaylord (1944) that the use of phi coefficient intercorrelations is responsible for the introduction of spurious "difficulty" factor in the factor matrix. Because of this and the fact that the phi coefficient is affected by the marginal proportions, the use of phi coefficient for factor analytic work has been almost abondoned. Instead of phi, most workers are inclined to use the tetrachoric correlation coefficient even though it is now well known that the cosine-pi approximation to r_t is satisfactory only when both the variables are dichotomized at their medians (Bouvier, *et.al*, 1954). In the present study, an attempt was made to see the similarity between the two factor-analytic results obtained from the use of the above two coefficients.

B. Method

Subjects

Data obtained from 248 Ss belonging to Sample 1 were used to obtain the inter-item correlation matrix.

Statistical Treatment

From the raw item matrix, two intercorrelation matrices were obtained, one in which the phi coefficients were calculated from the four fold tables and the other in which tetrachoric correlations were computed following the cosine-pi approximation. The computations were done using a Fortran program prepared by Flint (1964) for IBM 709. Both these intercorrelation matrices were then subjected to a principle factor analysis (Harman, 1960) using the largest correlations as the communalities. The computations were carried out with IBM 709 using the MESA 03 program of Carroll (1957) as modified by Flint. The program has also provisions for the computation of orthogonally rotated matrix which satisfies Kaiser's (1958) varimax criterion.

Results

The 50 x 50 intercorrelation matrix appears as Table 17. The phi coefficients are reported in the lower diagonal whereas the tetrachoric correlations are presented above the main diagonal. Since only ten factors were hypothesized in accordance with the ten aspects of achievement motivation covered by 50 test items as described in Chapter 2, the principal factor solution was obtained for the first ten factors accounting for almost 40 per cent of the total variance in the case of tetrachoric and almost 26 per cent in the case of phi. In both cases, however, only the

TABLE 17

Intercorrelations* Among n Ach Items of SCT

1.000	0.304	-0.029	0.057	0.255	0.199	0.114	0.077	0.049	0.070	0.240	0.058	-0.148	-0.142	0.112	0.213	0.286	0.179	0.254	0.129	0.116	0.271	-0.076	0.163	0.279	-0.093	0.011	0.137	0.115	-0.137	0.463	-0.128	0.002	-0.151	0.264	0.184	0.082	-0.196	-0.114	0.225	-0.029	0.227	0.310	0.383	0.178	0.106	0.095	0.133	0.034	-0.177
0.193	1.000	0.003	0.270	0.193	0.427	0.103	-0.010	-0.038	-0.018	0.078	0.276	-0.120	-0.180	0.170	0.096	0.438	0.418	0.129	0.311	-0.056	0.046	0.092	0.548	0.220	0.026	0.085	0.159	0.143	-0.139	0.158	-0.243	-0.041	0.177	-0.014	0.035	-0.064	0.085	-0.037	0.338	-0.020	0.137	0.252	0.209	0.159	0.009	0.126	0.189	0.362	0.107
-0.018	0.002	1.000	0.335	-0.048	0.180	0.084	0.045	0.138	-0.210	0.063	0.523	0.160	-0.371	0.249	-0.077	0.267	0.445	0.128	0.041	0.150	0.338	0.385	0.171	0.301	0.170	0.240	-0.186	-0.138	-0.196	-0.082	-0.048	0.049	-0.030	-0.075	-0.068	-0.071	0.032	-0.054	0.064	0.151	0.172	0.073	0.157	0.227	-0.004	0.011	0.210	0.509	0.147
0.035	0.167	0.192	1.000	0.218	0.263	0.269	-0.192	-0.138	0.091	0.122	0.077	-0.037	-0.149	0.336	0.203	0.194	0.283	0.038	-0.085	-0.092	0.050	0.280	[illegible]	0.167	-0.078	0.142	-0.044	0.110	-0.319	-0.085	-0.024	0.383	-0.220	-0.256	-0.015	-0.151	-0.151	-0.139	0.156	0.080	-0.021	0.120	-0.075	0.170	0.059	-0.108	-0.015	0.284	-0.003
0.158	0.120	-0.028	0.132	1.000	0.240	0.123	-0.009	-0.092	0.366	0.045	0.005	-0.048	-0.045	0.122	0.087	0.120	0.266	0.202	0.010	0.174	0.054	0.230	0.151	-0.020	0.062	0.292	-0.078	0.218	0.162	0.010	0.222	-0.161	0.076	0.078	0.017	-0.001	-0.182	-0.238	0.054	0.257	-0.006	0.007	0.187	0.042	-0.027	0.073	0.071	0.182	0.033
0.125	0.278	0.109	0.163	0.149	1.000	0.081	0.184	0.019	0.175	0.201	0.357	-0.015	-0.346	0.301	0.135	0.174	0.493	0.179	-0.023	-0.089	0.274	[illegible]	0.444	0.073	0.119	0.071	-0.118	0.091	-0.123	0.096	-0.015	0.261	0.120	-0.348	-0.175	-0.194	0.253	0.209	0.356	-0.059	-0.070	0.178	0.085	0.192	0.076	-0.062	-0.020	0.591	-0.005
0.060	0.054	0.041	0.143	0.063	0.042	1.000	0.192	-0.010	-0.102	0.232	0.096	-0.110	-0.038	0.276	0.092	0.128	0.085	0.195	0.018	-0.037	0.263	0.035	0.155	-0.052	0.139	0.012	-0.235	-0.076	0.071	0.018	-0.058	0.264	0.181	-0.022	0.182	-0.283	0.354	0.032	0.331	0.111	0.225	0.198	0.315	0.094	0.094	0.005	0.108	0.206	-0.098
0.040	-0.010	0.024	-0.103	-0.005	0.097	0.079	1.000	-0.215	-0.042	0.198	0.062	0.093	0.059	0.290	-0.116	0.045	0.229	0.040	-0.169	0.148	0.151	0.192	-0.082	-0.012	0.459	-0.038	-0.093	0.084	-0.070	0.039	0.008	-0.214	0.044	-0.004	0.123	-0.012	0.173	0.201	-0.148	-0.058	-0.114	0.050	0.201	-0.014	0.189	-0.061	0.123	0.041	-0.120
0.026	-0.020	0.069	-0.069	-0.047	0.008	-0.004	-0.106	1.000	-0.025	0.061	-0.208	0.189	0.014	-0.144	-0.134	0.135	-0.061	0.084	-0.212	0.268	0.107	-0.070	0.018	0.275	-0.006	-0.133	-0.099	-0.032	0.025	0.132	-0.098	0.048	-0.171	0.163	0.073	-0.058	-0.003	0.211	-0.039	0.198	0.179	0.076	-0.077	-0.001	-0.020	0.227	0.249	-0.285	0.339
0.041	-0.010	-0.124	0.053	0.224	0.105	-0.048	-0.021	-0.013	1.000	0.211	0.153	-0.142	0.042	0.029	-0.133	0.136	0.278	0.003	0.116	0.148	-0.017	0.222	0.163	-0.065	-0.110	-0.019	0.109	0.109	0.046	-0.107	0.038	-0.161	0.093	0.128	0.118	0.156	-0.087	0.179	0.210	0.301	0.233	0.073	0.342	-0.157	0.078	0.104	0.032	0.122	-0.163
0.128	0.042	[illegible]	0.063	0.024	0.108	0.097	0.099	0.028	0.104	1.000	0.106	0.143	0.130	0.079	-0.086	0.087	0.270	0.205	0.026	0.126	0.172	0.245	0.009	0.154	0.171	-0.072	0.100	0.008	-0.081	0.026	-0.274	0.216	-0.092	-0.176	0.146	-0.038	-0.147	0.145	0.068	-0.147	0.174	0.118	0.124	0.035	0.070	0.279	-0.059	-0.118	-0.156
0.032	0.154	0.252	0.041	0.002	0.202	0.045	0.028	-0.089	0.081	0.049	1.000	0.022	[illegible]	0.429	-0.150	0.329	0.547	0.090	-0.071	-0.113	0.413	0.317	0.475	-0.070	0.240	0.124	-0.198	-0.027	-0.077	-0.016	-0.037	-0.093	0.339	-0.217	0.041	-0.067	0.272	-0.050	0.218	-0.120	0.188	0.276	0.160	0.316	0.138	-0.139	0.244	0.494	0.166
-0.088	-0.072	0.092	-0.022	-0.028	-0.009	-0.053	0.047	0.100	-0.080	0.073	0.012	1.000	0.244	-0.164	-0.097	0.128	-0.066	-0.019	0.104	0.076	-0.177	0.143	-0.151	-0.112	0.334	-0.077	-0.192	0.054	0.171	0.020	-0.085	-0.117	0.194	-0.066	-0.242	0.123	-0.075	0.130	0.052	-0.136	-0.209	-0.072	0.018	-0.084	0.075	-0.088	0.038	-0.091	-0.058
-0.082	-0.104	-0.195	-0.084	-0.025	-0.205	-0.018	0.029	0.007	0.023	0.067	-0.301	0.129	1.000	-0.362	0.090	-0.062	-0.349	-0.269	0.223	0.439	-0.419	-0.065	[illegible]	-0.135	[illegible]	0.234	0.401	-0.016	0.172	0.015	-0.263	0.559	-0.096	0.279	0.042	0.105	0.136	-0.077	-0.162	0.464	0.073	-0.024	-0.070	-0.118	-0.043	-0.118	-0.144	-0.416	-0.074
0.066	0.101	0.139	0.203	0.071	0.183	0.145	0.137	-0.069	0.016	0.040	0.247	-0.092	-0.212	1.000	0.046	0.231	0.416	-0.041	-0.006	0.072	0.391	0.346	0.321	0.236	0.079	0.165	0.079	0.066	-0.142	-0.098	-0.030	-0.250	0.247	-0.207	0.103	-0.163	0.207	0.187	0.028	0.194	0.241	0.147	0.472	0.284	0.022	-0.260	0.246	0.279	0.200
0.126	0.057	-0.044	0.115	0.050	0.080	0.049	-0.058	-0.070	-0.077	-0.044	-0.081	-0.057	0.050	0.026	1.000	-0.101	0.125	0.078	-0.080	0.136	-0.017	0.000	0.099	0.087	0.048	0.131	-0.110	-0.025	-0.011	0.095	-0.217	-0.061	0.286	0.210	0.134	0.112	-0.001	-0.146	0.090	0.059	-0.154	0.072	-0.178	0.165	-0.037	-0.155	-0.036	-0.091	0.276
0.145	0.225	0.119	0.076	0.099	0.087	0.095	0.019	0.060	0.066	0.036	0.161	0.062	-0.019	0.115	-0.049	1.000	0.477	0.310	0.409	-0.052	[illegible]	0.166	0.270	0.284	0.389	0.010	0.294	0.179	0.032	0.046	0.212	0.063	0.063	-0.056	0.002	-0.090	0.122	0.024	[illegible]	0.432	0.310	0.037	0.389	0.204	0.305	0.064	0.127	0.503	0.170
0.099	0.239	0.218	0.112	0.149	0.207	0.040	0.099	-0.028	0.154	0.118	0.319	-0.034	-0.191	0.239	0.064	0.252	1.000	0.267	0.172	0.122	0.457	0.425	0.461	0.218	0.231	0.151	-0.049	0.126	-0.148	-0.027	0.044	-0.000	0.254	-0.197	0.127	0.038	0.147	-0.060	0.340	0.147	0.365	0.323	0.367	0.558	0.128	0.086	0.160	0.203	0.292
0.161	0.082	0.078	0.023	0.125	0.113	0.103	0.022	0.045	0.082	0.112	0.028	-0.012	-0.157	-0.025	0.047	0.156	0.149	1.000	0.219	-0.260	0.118	0.013	0.292	0.170	-0.023	-0.072	-0.080	-0.044	0.062	0.181	-0.148	0.128	0.200	0.005	0.182	-0.041	0.137	0.144	0.190	-0.179	0.214	0.005	0.299	-0.032	0.161	-0.262	0.029	0.018	0.120
0.066	0.142	0.020	-0.041	0.005	-0.012	0.008	-0.079	-0.083	0.057	0.012	-0.030	0.052	0.096	-0.003	-0.039	0.200	0.081	0.113	1.000	0.247	0.095	0.127	0.162	0.119	0.422	0.188	0.585	0.134	0.269	0.312	-0.142	-0.239	0.121	0.227	0.242	0.247	-0.005	-0.230	0.225	0.332	0.206	-0.008	0.477	0.090	0.514	0.134	0.242	0.238	0.034
0.072	-0.034	0.089	-0.054	0.106	-0.055	-0.019	0.076	[illegible]	0.088	0.067	-0.059	0.045	0.238	0.042	0.080	-0.025	0.067	-0.163	0.128	1.000	-0.087	0.089	0.041	0.131	0.617	0.121	0.070	-0.006	0.363	0.247	-0.092	-0.037	0.112	0.291	0.116	0.275	0.219	-0.015	0.219	0.269	0.307	0.043	0.351	0.097	0.194	0.202	0.244	-0.087	-0.071
0.139	0.029	0.206	0.031	0.033	0.175	0.140	0.080	0.101	-0.010	0.094	0.234	-0.107	-0.250	0.240	-0.010	0.109	0.262	0.075	0.049	-0.054	1.000	0.408	0.321	0.388	0.238	0.058	-0.084	0.004	0.052	-0.023	-0.051	-0.137	0.012	-0.127	0.102	0.113	0.166	0.173	0.169	-0.096	0.070	0.286	-0.021	0.520	-0.065	0.009	0.278	0.269	0.148
-0.047	0.058	0.233	0.174	0.143	0.204	0.018	0.101	-0.016	0.136	0.131	0.178	0.087	-0.037	0.212	0.000	0.083	0.244	0.008	0.065	0.055	0.265	1.000	0.279	0.214	0.567	0.339	0.238	0.027	0.207	-0.236	-0.312	0.113	0.254	-0.157	-0.005	-0.054	0.195	0.258	0.090	0.040	0.231	0.139	0.216	0.095	0.268	-0.191	0.124	0.513	-0.012
0.098	0.353	0.097	0.186	0.090	0.280	0.079	-0.043	0.009	0.095	0.085	0.278	-0.086	-0.144	0.192	0.056	0.136	0.270	0.123	0.082	0.025	0.198	0.171	1.000	0.138	0.348	0.245	0.071	-0.059	-0.133	0.086	-0.070	-0.102	0.061	-0.068	0.064	-0.046	0.318	0.086	0.316	-0.183	0.061	0.320	0.312	0.215	0.037	-0.168	0.338	0.312	0.028
0.179	0.145	0.104	0.103	-0.013	0.046	-0.027	-0.006	0.150	-0.039	0.084	-0.038	-0.068	-0.078	0.142	0.052	0.143	0.121	0.108	0.061	0.082	[illegible]	0.136	0.084	1.000	0.302	0.104	0.109	-0.046	-0.048	0.040	-0.205	0.070	-0.002	0.029	0.129	0.123	-0.005	0.159	0.093	0.048	0.315	0.006	0.174	0.289	0.229	-0.039	0.288	-0.044	0.008
-0.033	0.009	0.056	-0.026	0.022	0.043	0.045	0.105	-0.002	-0.036	0.049	0.085	0.127	0.103	0.027	0.016	0.143	0.082	-0.008	0.161	0.241	0.087	0.212	0.133	0.111	1.000	0.326	0.365	0.127	0.821	0.264	-0.689	0.315	0.524	-0.176	-0.002	0.313	0.353	0.043	0.398	0.440	0.341	0.116	0.709	0.158	0.503	0.391	0.463	0.542	0.241
0.006	0.048	0.127	0.079	0.170	0.041	0.006	-0.018	-0.061	-0.010	-0.036	0.063	-0.042	0.115	0.091	0.069	0.005	0.078	-0.041	0.092	0.069	[illegible]	0.199	0.139	0.059	0.123	1.000	0.266	0.077	0.291	0.099	0.279	-0.063	0.266	0.032	0.049	0.062	0.250	-0.046	-0.063	0.250	0.158	-0.005	0.567	0.060	0.512	0.107	0.081	-0.038	0.162
0.073	0.089	-0.099	-0.022	-0.040	-0.062	-0.093	-0.043	-0.043	0.056	0.049	-0.085	-0.094	0.171	0.040	-0.057	0.139	-0.022	-0.042	0.338	-0.037	-0.044	0.129	0.037	[illegible]	0.137	0.138	1.000	0.021	0.198	0.233	-0.333	-0.161	-0.161	0.499	0.506	0.338	0.079	-0.289	-0.026	0.322	0.136	0.169	0.285	0.256	0.340	0.128	0.233	0.176	-0.366
0.072	0.091	-0.084	0.060	0.136	0.057	-0.039	0.049	-0.017	0.065	0.005	-0.015	0.033	-0.009	0.039	-0.015	0.089	0.070	-0.029	0.069	-0.004	0.003	0.017	-0.036	-0.029	0.046	0.044	0.011	1.000	0.221	0.134	-0.018	0.049	0.485	-0.058	-0.085	0.087	-0.027	-0.036	[illegible]	0.078	0.076	0.068	0.084	-0.074	0.153	0.080	0.120	0.161	-0.013
-0.065	-0.067	-0.097	-0.141	0.080	-0.068	0.030	-0.030	0.011	0.022	-0.036	-0.032	0.084	0.073	-0.063	-0.005	0.012	-0.060	0.031	0.122	0.187	0.026	0.104	-0.060	-0.024	0.435	0.144	0.090	0.110	1.000	0.318	-0.090	-0.056	0.258	0.112	0.251	0.145	0.260	-0.187	0.298	0.432	0.138	0.037	0.516	-0.105	0.305	0.322	0.371	0.086	-0.021
0.290	0.001	-0.001	-0.041	0.005	0.049	0.008	0.016	0.060	-0.050	0.012	-0.007	0.010	0.007	-0.046	0.045	0.019	-0.012	0.093	0.140	0.128	-0.012	-0.117	0.039	[illegible]	0.091	0.047	0.113	0.069	0.148	1.000	-0.277	0.018	0.018	0.303	0.393	0.125	0.076	0.145	0.413	0.212	0.406	0.391	0.588	0.090	0.315	0.256	0.356	0.041	-0.470
-0.048	-0.091	-0.010	-0.009	0.088	-0.006	-0.018	0.009	-0.031	0.014	-0.104	-0.012	-0.031	-0.104	-0.011	-0.086	0.074	0.015	-0.057	-0.041	-0.034	-0.020	-0.119	-0.029	[illegible]	[illegible]	0.111	-0.090	-0.007	-0.028	-0.074	1.000	0.235	0.352	-0.211	-0.344	-0.112	0.266	-0.040	-0.183	0.266	-0.202	-0.244	0.333	-0.104	0.030	0.055	-0.278	0.469	0.198
0.001	-0.015	0.017	0.153	-0.056	0.100	0.096	-0.077	0.016	-0.053	0.063	-0.029	-0.041	0.147	-0.080	-0.022	0.019	0.000	0.048	-0.063	-0.013	-0.050	0.043	-0.035	0.026	[illegible]	[illegible]	-0.046	0.019	-0.016	0.005	0.046	1.000	0.390	-0.311	-0.069	0.021	0.308	0.267	0.117	-0.247	-0.164	-0.042	0.106	-0.240	-0.079	-0.145	-0.069	-0.347	-0.425
-0.054	0.067	-0.011	-0.074	[illegible]	0.045	0.062	0.020	-0.049	0.034	-0.031	0.130	0.074	-0.034	0.095	0.033	0.019	0.094	0.076	0.039	0.042	[illegible]	0.098	0.022	-0.001	0.186	0.101	-0.046	0.182	0.089	0.005	0.111	0.124	1.000	-0.157	0.005	0.101	0.472	-0.000	0.037	0.086	0.293	0.031	0.467	-0.098	0.459	0.029	0.005	0.904	0.317
0.168	-0.009	-0.046	-0.156	0.049	-0.222	-0.011	-0.002	0.088	0.077	-0.098	-0.118	-0.040	0.168	-0.123	0.126	-0.028	-0.107	0.003	0.117	0.158	-0.080	-0.099	-0.041	0.018	-0.063	0.018	0.252	-0.037	[illegible]	0.157	-0.081	-0.113	-0.058	1.000	0.303	0.170	-0.172	-0.140	-0.064	0.196	0.178	0.271	0.167	0.036	0.368	-0.077	0.168	-0.127	-0.258
0.116	0.022	-0.041	-0.009	0.010	-0.110	0.096	0.066	0.039	0.071	0.079	0.023	-0.147	0.024	0.061	0.081	0.001	0.070	0.116	0.125	0.072	0.069	-0.003	0.039	0.082	-0.001	0.028	0.280	-0.054	0.126	0.206	-0.128	-0.026	0.082	0.334	1.000	0.161	0.107	-0.125	0.160	-0.050	0.196	0.147	0.387	0.019	0.233	0.146	0.316	-0.273	-0.113
0.049	-0.038	-0.041	-0.085	0.000	-0.119	-0.128	-0.006	-0.028	0.090	-0.020	-0.034	0.071	[illegible]	-0.089	0.062	-0.041	0.020	-0.025	0.126	0.166	0.067	-0.032	-0.026	0.073	0.118	0.034	0.184	0.004	0.070	0.062	-0.030	0.008	0.037	0.102	0.096	1.000	0.099	-0.068	[illegible]	0.309	0.104	-0.027	0.147	0.068	0.079	0.147	0.103	-0.335	-0.239
-0.083	0.078	0.014	-0.062	-0.075	0.115	0.156	0.060	-0.001	-0.035	-0.060	0.118	-0.031	0.052	0.092	-0.001	0.045	0.060	0.061	-0.002	0.099	0.074	0.088	0.147	-0.002	0.118	0.110	0.030	-0.012	0.105	0.027	0.088	0.102	0.181	-0.075	0.048	0.042	1.000	0.339	0.224	0.195	0.232	0.193	0.374	0.117	0.179	-0.274	0.199	0.330	-0.316
-0.046	-0.015	-0.022	-0.054	-0.091	0.089	0.011	0.065	0.083	0.075	0.049	-0.018	0.054	-0.030	0.078	-0.061	0.008	-0.021	0.061	-0.068	-0.006	0.073	0.111	0.035	0.067	0.011	-0.017	-0.087	-0.015	-0.055	0.053	-0.010	0.082	0.030	-0.058	-0.032	-0.026	0.127	1.000	-0.091	-0.360	-0.039	-0.072	0.346	0.030	-0.561	-0.286	0.091	0.289	-0.519
0.134	0.209	0.036	0.091	0.031	0.216	0.176	-0.077	[illegible]	0.121	0.030	0.117	0.038	-0.090	0.016	0.050	0.235	0.191	0.113	0.114	0.127	0.101	0.053	0.188	0.055	0.155	-0.033	-0.013	0.056	0.146	0.222	-0.062	0.043	0.013	-0.038	0.095	0.071	0.108	-0.020	1.000	0.325	0.423	0.355	0.485	0.137	0.151	0.105	0.274	0.295	-0.146
-0.013	-0.009	0.062	0.035	0.117	-0.026	0.043	-0.022	0.081	0.138	-0.060	-0.043	-0.055	0.154	0.067	0.024	0.194	[illegible]	-0.078	0.143	0.122	-0.042	0.018	-0.073	0.021	0.159	0.110	0.141	0.035	0.194	0.085	0.088	-0.054	0.024	0.088	-0.022	0.141	0.069	-0.083	0.149	1.000	0.448	0.087	0.580	0.174	0.454	0.412	0.107	0.220	0.226
0.111	0.067	0.076	-0.010	-0.003	-0.033	0.099	-0.049	0.079	0.113	0.068	0.085	-0.091	0.031	0.117	-0.073	0.138	0.178	0.104	0.088	0.153	0.034	0.113	[illegible]	0.155	0.119	0.072	0.058	0.037	0.055	0.195	-0.052	-0.042	0.102	0.087	0.094	0.049	0.090	-0.012	0.217	0.212	1.000	0.154	0.547	0.082	0.282	0.015	0.237	0.316	0.117
0.197	0.140	0.045	0.373	0.004	0.113	0.103	0.027	0.041	0.044	0.045	0.150	-0.044	-0.014	[illegible]	0.043	0.018	0.177	0.003	-0.004	0.027	0.183	0.088	0.195	[illegible]	0.042	-0.003	0.093	0.043	0.018	0.197	-0.096	-0.016	0.011	0.174	0.093	-0.016	0.085	-0.031	0.211	0.038	0.074	1.000	0.383	0.271	0.058	-0.041	0.322	0.386	-0.106
0.153	0.081	0.055	-0.027	0.073	0.033	0.119	0.030	-0.024	0.138	0.035	0.058	0.066	-0.025	0.199	-0.069	0.150	0.147	0.116	0.199	0.140	[illegible]	[illegible]	0.129	0.067	0.319	0.240	0.107	0.032	0.219	0.266	0.104	0.026	0.162	0.065	0.151	0.055	0.134	0.116	0.206	0.249	0.236	0.131	1.000	0.318	0.716	0.419	0.666	0.486	-0.163
0.109	0.099	0.139	0.101	0.025	0.119	0.040	-0.008	-0.001	-0.094	0.019	0.164	-0.050	-0.066	0.163	0.099	0.096	0.285	-0.020	0.044	0.059	[illegible]	0.059	0.125	0.181	0.054	[illegible]	0.129	-0.046	-0.052	0.044	-0.041	-0.092	-0.037	0.023	0.009	0.040	0.090	0.012	0.079	0.073	0.029	0.171	0.111	1.000	0.027	-0.004	0.305	0.442	-0.173
0.048	0.004	-0.002	0.026	-0.012	0.034	0.036	0.065	-0.007	0.030	0.026	0.057	0.033	-0.018	0.009	-0.016	0.127	0.053	0.073	0.249	0.088	-0.029	0.123	0.016	0.102	0.194	0.255	0.270	0.069	0.127	0.135	0.088	-0.019	0.175	0.168	0.106	0.034	0.063	-0.017	0.066	0.195	0.114	0.026	0.356	0.012	1.000	0.195	0.381	0.316	0.212
0.056	0.075	0.066	-0.060	0.042	-0.036	0.082	-0.031	0.120	0.059	0.135	-0.069	-0.049	-0.065	-0.139	[illegible]	0.030	0.045	-0.155	0.066	0.120	0.006	-0.112	-0.093	-0.023	0.152	0.058	0.065	0.047	0.164	0.131	0.020	-0.048	0.010	-0.046	0.087	0.084	-0.103	-0.101	0.059	0.195	0.007	-0.024	0.174	-0.003	0.087	1.000	-0.029	0.057	0.442
0.083	0.120	0.127	-0.009	0.044	-0.012	0.056	0.066	0.135	0.019	-0.033	0.135	0.023	-0.083	0.148	-0.022	0.063	0.089	0.019	0.125	0.155	0.178	0.078	0.209	0.188	0.170	0.046	0.126	0.076	0.188	0.186	-0.182	-0.026	0.082	0.107	0.203	0.061	0.071	0.021	0.165	0.048	0.116	0.207	0.258	0.191	0.175	-0.017	1.000	0.189	0.019
0.013	0.137	0.152	0.109	0.068	0.227	0.071	0.012	-0.076	0.044	-0.046	0.203	-0.031	-0.167	0.106	-0.033	0.205	0.072	0.007	0.082	-0.031	0.101	0.196	0.121	-0.016	0.194	-0.012	0.060	0.060	0.026	0.013	0.163	-0.058	0.177	-0.046	-0.097	-0.102	0.110	0.089	0.113	0.070	0.111	0.138	0.178	0.149	0.105	0.020	0.070	1.000	0.071
-0.068	0.043	0.054	-0.001	0.013	-0.082	-0.031	-0.044	0.130	-0.058	-0.059	0.063	-0.022	-0.028	0.081	0.097	0.059	0.118	0.049	0.011	-0.028	0.060	-0.005	0.011	0.003	0.048	0.063	-0.101	-0.005	-0.006	-0.116	0.044	-0.074	0.099	-0.102	-0.045	-0.083	-0.071	-0.096	-0.050	0.075	0.039	-0.043	-0.035	-0.070	0.070	0.194	0.006	0.016	1.000

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* The phi Coefficients appear below the main diagonal and the tetrachoric correlations are shown above the main diagonal.

first seven factors corresponding to the first seven largest eigen roots appeared to be statistically significant. These principal factors were rotated to an orthogonal simple structure by using Kaiser's (1958) varimax criterion. The varimax solution approaches a simple structure if one exists in the data by maximizing the variance of the squared extended vector projections. This process is carried out repeatedly on each possible pair of factors until an acceptable degree of convergence is obtained. A factor was not interpreted, however, unless the product of its two highest loadings exceeded two standard errors of a zero-order correlation for an N of the magnitude used in this study (Fruchter, 1954, p.79). The principal factor matrices, one for the phi coefficients and another for the tetrachoric correlations are shown separately in Tables 18 and 19 respectively. The rotated matrices are reported in Table 20 and Table 21 along with the obtained communabilities (h^2) for each variable.

Interpretation of Factors.

From Tables 20 and 21, we find that the following items have a large projection on the first rotated factors:

Factor A (Identification with a Successful Authority)

Item No.	Item-description	Factor Loading	
3.	I wish I could have always been (successful in doing difficult jobs.)	.405	.599
12.	I am very serious (about being a great man in my own job or profession.)	.514	.634
14.	I will be very happy if (I can do something very valuable.)	.383	.549

TABLE 17

Principal Factor Solution of Phi Intercorrelation Matrix

Item No.	Principal Factor Loading Corresponding to the First Ten Factors									
	I	II	III	IV	V	VI	VII	VIII	IX	X
1	.273	.044	-.0375	.164	.081	-.031	.105	.038	.079	.045
2	.377	-.147	-.179	.292	.000	.057	.047	-.191	-.172	.081
3	.276	-.227	.064	-.262	-.139	-.094	.103	-.060	.098	.062
4	.197	-.261	-.030	.136	-.114	.218	.089	-.023	.058	.196
5	.196	-.014	.017	.286	-.118	.135	.129	.282	.010	-.025
6	.359	-.361	.049	.169	.127	.133	.069	-.022	-.064	-.006
7	.195	-.070	-.070	.017	.218	.006	-.047	.094	.134	.156
8	.084	-.028	.052	-.136	.090	.071	-.072	.121	.084	-.161
9	.027	.073	-.076	-.167	.048	-.169	.273	-.029	.119	.046
10	.154	.068	.006	.242	-.054	.131	.062	.229	.092	-.358
11	.135	-.035	-.064	-.028	.084	.162	.222	-.022	.184	-.178
12	.383	-.326	.080	-.069	-.008	-.128	-.142	.047	-.129	-.169
13	-.048	.055	.200	-.116	.102	.067	.145	-.163	-.050	-.068
14	-.194	.402	.056	-.022	.008	.344	.088	-.020	.020	.059
15	.371	-.252	.023	-.109	-.111	.035	-.138	.163	.100	-.024
16	.049	.002	-.140	.047	-.014	.143	.035	.115	-.108	.302
17	.374	-.018	.045	.154	-.084	-.086	.083	-.262	.101	-.035
18	.507	-.248	-.017	.042	-.112	.001	.118	.088	.013	-.062
19	.197	-.084	-.122	.103	.180	-.038	-.011	-.147	.227	.009
20	.281	.320	-.025	.101	-.163	.036	-.059	-.303	-.037	-.096
21	.179	.337	.049	-.148	.019	.113	.220	.196	-.040	.100
22	.390	-.267	-.108	-.314	-.053	-.098	.063	.074	-.020	-.062
23	.378	-.139	.201	-.183	-.119	.318	.012	.017	.060	-.128
24	.447	-.235	-.103	.064	.032	.121	-.086	-.030	-.187	.056
25	.287	-.014	-.172	-.230	-.117	.027	.160	-.147	.195	.132
26	.377	.292	.379	-.182	.107	.074	.127	-.096	-.170	.015
27	.240	.140	.191	.019	-.225	.141	-.127	.114	.049	.234
28	.201	.396	-.169	.011	-.265	.178	-.199	-.209	-.039	-.126
29	.112	.053	.105	.205	.030	.032	.053	.024	-.062	-.048
30	.183	.428	.283	-.078	.154	-.040	.072	.091	-.210	-.038
31	.240	.306	-.204	.068	.269	-.141	.002	-.021	-.024	.067
32	-.049	-.070	.239	.177	-.081	-.183	-.142	.099	.104	.048
33	-.009	-.038	.118	.033	.230	.189	.058	-.112	.144	.148
34	.187	.033	.306	.076	.095	-.014	-.138	.038	.032	.136
35	.016	.423	-.376	-.024	-.068	.009	-.160	.112	.014	.050
36	.198	.296	-.352	-.075	.041	.011	-.144	.115	.097	-.044
37	.059	.274	-.054	-.086	-.068	.055	.073	.023	-.092	-.072
38	.208	.010	.183	-.099	.223	.067	-.223	.033	.007	.116
39	.044	-.093	.069	-.133	.219	.071	-.068	-.043	.169	-.107
40	.402	.054	-.052	.160	.252	-.060	.143	-.044	-.100	-.028
41	.220	.314	.166	.118	-.189	-.108	.109	.097	.059	.095
42	.324	.170	-.012	.015	.042	-.108	.054	.043	.218	-.028
43	.324	-.004	-.229	-.017	.146	.003	-.055	.101	-.167	-.005
44	.479	.308	.159	.073	.107	-.126	-.133	.061	.163	.017
45	.340	-.116	-.118	-.221	-.151	-.046	-.011	.018	-.155	.079
46	.318	.326	.137	.042	-.126	-.036	-.204	-.128	.167	.009
47	.079	.233	.084	.115	-.104	-.266	.278	.051	-.053	-.115
48	.392	.156	-.120	-.219	.071	-.099	-.049	.024	-.101	.017
49	.332	-.130	.210	.096	-.009	-.100	-.163	-.075	-.078	-.043
50	.043	-.066	.154	.034	-.212	-.227	.154	.012	.008	.200
λ =	3.644	2.398	1.437	1.039	0.908	0.832	0.823	0.706	0.666	0.648

TABLE 18

Principal Factor Solution of Tetrachoric Correlation Matrix

Item No.	Principal Factor Loading Corresponding to the First Ten Factors									
	I	II	III	IV	V	VI	VII	VIII	IX	X
1	.300	.010	-.513	-.053	.228	.198	.133	.001	.002	.001
2	.418	-.243	-.253	-.124	.152	.281	-.260	.005	-.003	-.001
3	.352	-.370	.023	-.074	-.347	-.067	.165	.003	.007	-.003
4	.169	-.368	-.103	-.047	-.028	.369	.050	.009	.084	-.003
5	.229	-.052	.028	-.267	.168	.244	.174	-.008	.001	.006
6	.389	-.525	.016	.139	.129	.234	-.154	.011	.004	-.004
7	.285	-.149	.005	.207	.168	.095	.204	.008	-.007	-.003
8	.168	-.052	.088	.243	-.112	-.230	.143	.004	.001	-.004
9	.011	.107	-.133	.013	-.267	.117	.196	.008	.009	.010
10	.207	.050	-.030	-.109	.234	.109	.140	.016	-.012	.000
11	.177	-.052	.169	.236	-.138	.320	.085	.001	-.003	.005
12	.462	-.519	.048	-.042	-.091	-.199	-.133	.007	-.005	.004
13	-.019	.097	.232	.194	-.248	.059	-.194	.021	.009	-.014
14	-.136	.637	.158	.275	-.098	.303	.055	.007	-.108	.001
15	.442	-.395	-.021	-.048	-.067	-.216	.299	.019	.008	-.008
16	.041	.000	-.111	-.059	-.049	.200	.140	.017	-.101	.007
17	.552	-.119	.021	-.182	.070	.209	-.158	.008	-.141	.005
18	.613	-.415	-.085	-.149	-.109	.174	.126	.019	-.008	.000
19	.235	-.143	-.156	.107	.171	.149	.047	-.019	.006	.013
20	.461	.386	-.074	-.206	.023	.038	-.285	.104	-.091	.002
21	.316	.440	.067	.125	-.232	.085	.272	.008	.000	.010
22	.403	-.394	-.192	.030	-.318	-.164	.084	.009	.017	.009
23	.496	-.223	.184	.204	-.337	.001	.006	.141	.009	.107
24	.496	-.364	-.189	.055	.027	.026	-.094	.006	-.018	.041
25	.330	-.038	-.257	.061	-.280	.080	.240	.001	.003	-.051
26	.760	.359	.389	.292	-.480	.125	-.195	.000	.001	.000
27	.369	.153	.275	-.140	.019	-.048	.286	.010	.105	-.091
28	.332	.524	-.286	-.083	-.009	-.134	-.153	.009	.081	-.073
29	.180	.052	.174	-.060	.165	.173	-.153	.001	.007	.000
30	.366	.579	.336	.059	-.081	-.060	-.181	.121	.001	-.104
31	.389	.398	-.347	.188	.281	-.018	-.112	.019	-.031	.007
32	-.107	-.209	.507	-.305	.512	-.151	.367	.001	.004	-.001
33	-.036	-.036	.242	.631	.193	.475	.214	.000	.000	.018
34	.408	-.034	.597	.059	.184	.013	-.016	.141	.004	-.016
35	.053	.516	-.429	-.123	.126	-.228	.120	.001	.017	.009
36	.259	.340	-.436	.056	.061	-.116	.190	.104	.000	.010
37	.114	.382	-.071	.044	-.101	-.001	.015	.009	.031	.093
38	.384	-.043	.313	.431	.208	-.237	.103	.105	.000	.018
39	.063	-.208	.044	.581	1114	-.214	.162	.151	.103	-.009
40	.538	.012	-.131	.091	.181	.266	-.206	.009	.118	.001
41	.434	.444	.241	-.411	.050	.107	.213	.081	-.105	.058
42	.540	.172	-.070	-.065	.039	.040	.255	.061	.000	-.104
43	.399	-.062	-.311	.088	.100	-.067	-.057	.105	-.104	.107
44	.869	.292	.125	.059	.347	-.160	.095	.000	.001	.005
45	.412	-.204	-.277	-.069	-.155	-.212	.083	.019	.130	.000
46	.575	.372	.177	-.149	.088	-.143	.023	.014	.111	-.008
47	.172	.309	.101	-.378	-.099	.214	-.008	.006	-.005	-.004
48	.545	.156	-.206	.094	-.147	-.276	-.020	.001	.138	.103
49	.629	-.385	.281	-.157	.186	-.239	-.392	.018	-.120	.000
50	.058	-.148	.299	-.612	-.377	.170	.146	.283	.128	-.071
λ =	7.508	4.709	2.947	2.542	2.078	1.795	1.442	.171	.125	.068

TABLE 19

Projections of Test-items on the Rotated Factors for ø-Matrix

Item No.	Varimax Factor Loadings corresponding to the first Seven Factors							h^2
	A	B	C	D	E	F	G	
1	.058	.300	-.330	-.081	-.062	.012	.123	.272
2	.177	.506	-.022	-.083	-.029	.144	.048	.359
3	.405	-.028	.130	-.002	.052	.016	-.085	.256
4	.157	.158	.138	-.150	.016	.021	.106	.236
5	.057	.095	-.030	.017	.070	-.037	.433	.249
6	.289	.381	.170	-.065	.052	-.078	.151	.330
7	.078	.138	-.104	-.027	.209	-.148	-.007	.144
8	.119	-.087	-.036	.053	.042	-.037	.094	.095
9	.009	-.009	-.049	.108	-.075	-.087	-.074	.162
10	.017	.047	-.065	.017	-.004	.073	.519	.299
11	.042	.089	.033	.041	-.127	.032	.204	.172
12	.514	.160	.060	-.045	.108	-.033	.044	.348
13	-.073	.013	.221	.215	-.046	.033	-.077	.128
14	.383	-.163	-.025	.272	-.067	.174	.051	.332
15	.456	-.019	-.031	-.099	.167	.007	.128	.284
16	-.002	.059	-.126	.032	-.018	-.081	-.031	.162
17	.155	.304	.091	-.038	.140	.263	.064	.325
18	.468	.228	.025	-.013	.068	.027	.241	.358
19	.024	.260	-.070	-.171	.093	.030	-.007	.178
20	-.004	.178	-.084	.126	-.084	.507	.017	.325
21	-.007	-.067	-.158	.435	.050	.006	.112	.281
22	.563	.040	-.060	.034	-.057	-.060	-.026	.359
23	.379	-.033	.187	.146	.074	.190	.194	.372
24	.383	.345	-.046	-.017	.035	.058	.025	.331
25	.238	.029	-.074	.011	-.045	.165	-.092	.282
26	.121	.120	.120	.582	.236	.172	-.036	.475
27	.102	-.111	-.017	.105	.329	.183	.086	.270
28	.000	-.021	-.245	.099	-.038	.592	.026	.428
29	-.043	.163	.050	.080	.088	.028	.167	.080
30	-.062	.039	-.069	.558	.208	.043	.032	.387
31	-.081	.290	-.380	.170	.102	.023	-.066	.295
32	-.032	-.075	.116	-.157	.302	-.076	.070	.179
33	-.156	.113	.143	.019	.100	-.056	-.056	.163
34	.030	.071	.085	.094	.394	-.010	-.001	.185
35	-.135	-.102	-.538	.049	-.048	.190	-.010	.366
36	.032	-.004	-.512	.041	-.002	.150	.045	.303
37	-.027	-.055	-.139	.241	-.084	.151	.050	.116
38	.104	.058	-.031	.121	.308	-.034	-.114	.205
39	.044	.004	.049	-.018	.062	-.049	-.032	.132
40	.106	.460	-.114	.182	.081	-.015	.091	.293
41	-.024	-.014	-.065	.209	.271	.153	.177	.269
42	.087	.101	-.178	.082	.212	.091	.133	.200
43	.235	.244	-.290	.094	-.025	-.037	.015	.220
44	.094	.161	-.225	.199	.487	.169	.116	.430
45	.443	.056	-.145	.057	-.069	.069	-.102	.266
46	.026	.016	-.122	.089	.369	.402	.028	.331
47	-.049	.061	-.011	.212	.021	.023	.174	.258
48	.287	.113	-.290	.240	.079	.088	-.103	.268
49	.264	.205	.114	-.007	.272	.096	.018	.230
50	.088	-.034	.156	-.010	.137	-.059	-.031	.190
Total Var.	4.805	3.080	3.077	3.025	2.748	2.527	1.832	21.091

TABLE 20

Projection of Test-items on the Rotated Factors for Tetrachoric Matrix

Item No.	Varimax Factor Loadings corresponding to the first seven rotated factors							
	A'	D'	G'	F'	C'	B'	E'	h^2
1	.067	-.332	-.241	-.001	.359	.404	.011	.465
2	.190	-.047	.046	-.147	.109	.639	-.018	.483
3	.599	.069	-.143	-.008	-.151	.062	.089	.418
4	.153	-.112	-.185	-.027	-.226	.440	-.020	.316
5	.029	-.195	-.099	-.123	-.062	.262	.330	.245
6	.301	.038	.093	.182	-.213	.601	-.028	.541
7	.122	-.076	-.096	.331	-.006	.246	.159	.225
8	239	.115	-.008	.298	.042	-.137	.057	.183
9	.060	.051	-.364	-.061	.058	-.087	-.005	.153
10	-.028	-.177	-.033	.020	.092	.190	.257	.144
11	.057	.121	-.366	.128	.028	.271	-.069	.247
12	.634	.059	.248	.063	-.105	.266	.022	.552
13	-.060	.432	.002	.026	-.085	-.064	-.045	.204
14	.549	.377	-.326	.079	.163	-.151	.153	.629
15	.620	-.167	-.026	.181	-.045	.085	.200	.495
16	.003	-.073	-.240	-.067	-.011	.100	.041	.079
17	.243	.098	.068	-.138	.076	.500	.280	.426
18	.578	-.040	-.156	-.033	-.066	.468	.225	.635
19	.081	-.110	-.072	.157	.066	.334	.019	.165
20	.008	.228	.108	-.276	.472	.232	.276	.493
21	.009	.274	-.372	.091	.280	-.112	.369	.449
22	.672	.032	-.112	.061	.030	.120	-.079	.490
23	.487	.390	-.089	.180	-.074	.164	.148	.483
24	.448	-.012	.043	.102	.086	.455	-.016	.427
25	.347	.031	-.398	.037	.170	.099	.042	.322
26	.256	.919	-.135	.100	.252	.164	.445	1.226
27	.144	.034	-.043	.051	.047	-.049	.556	.340
28	-.020	.124	-.002	-.169	.673	.013	.133	.514
29	-.112	.110	.133	-.044	-.019	.249	.207	.149
30	-.136	.525	.119	-.015	.346	-.077	.440	.628
31	-.116	.010	.006	.157	.663	.268	.086	.557
32	-.089	-.361	.345	.137	-.435	-.137	.509	.825
33	-.362	.171	-.297	.605	-.280	.269	.056	.768
34	.060	.264	.286	.232	-.185	.169	.539	.562
35	-.125	-.236	-.092	-.104	.647	-.193	.059	.550
36	.051	-.156	-.223	.076	.585	-.004	.068	.429
37	-.096	.163	-.142	-.038	.313	-.090	.112	.176
38	.153	.170	.215	.600	.059	.051	.281	.543
39	.129	.023	.337	.660	-.026	-.030	-.127	.472
40	.071	.135	.008	.060	.262	.586	.148	.461
41	-.030	.050	-.085	-.257	.215	.015	.741	.671
42	.213	-.025	-.189	.064	.309	.174	.432	.398
43	.254	-.063	.014	.113	.341	.294	-.022	.285
44	.207	.087	.186	.299	.524	.300	.690	1.016
45	.544	-.086	-.053	.001	.226	.104	.004	.368
46	.123	.169	.132	-.022	.390	.053	.578	.550
47	-.089	.112	-.115	-.400	.093	.047	.359	.334
48	.399	.167	-.009	.094	.507	.046	.126	.470
49	.492	.152	.624	.008	-.026	.410	.264	.893
50	.263	.037	-.142	-.549	-.404	-.092	.343	.681
Total Var.	8.767	5.273	3.976	4,964	8.321	7.000	7.987	46.00

15.	I like to praise those who (have earned a reputation in their own field.)	.456	.620
18.	I like to be (a great authority in some job or profession.)	.468	.578
22.	I am happiest when (successful in my work.)	.563	.672
23.	I often think of (accomplishing something great.)	.379	.487
24.	I like to be able (to do things better than others.)	.383	.448
45.	I feel happy (when I have finished successfully a difficult task.)	.443	.544
49.	I believe that (my future depends upon doing some notable work.)	.264	.492

In view of the appreciably high projections for the items listed above, it seems evident that Factor A should be interpreted as an ambition to become a successful authority.

The loadings of the second rotated factor on the items listed below immediately suggests that a plausible interpretation of this factor will be Ego-ideal. Hgih factor saturations were found for those items which reflect the sentiments and feelings of an internalized exemplars. The items defining this factor along with the loading associated with them are:

Factor B (Ego Ideal)

Item No.	Item-description	ϕ	r_t
1.	I like (to do my best in whatever work I undertake.)	.300	.404
2.	In accomplishing a task, I like (to do it much better than others.)	.500	.639

6.	I often desire to be (successful in doing something very significant.)	.381	.601
17.	It is my nature (to undertake tasks which require great skill.)	.304	.500
18.	I like to be (a great authority in some job or profession.)	.228	.468
24.	I like to be able to (do things better than others.)	.345	.455
40.	I take pains (to overcome obstacles and attain a high standard.)	.460	.586
49.	I believe that (my future depends upon my doing some notable work.)	.205	.410

Interpretation of Factor C also presents no difficulty either for the phi correlation matrix or the tetrachoric coefficients. The items defining this factor along with their projections on Factor C are shown below:

Factor C (Perseverance)

Item No.	Item-description	Rotated Factor Loadig ϕ	 r_t
1.	I like (to do my best in whatever work I undertake.)	.330	.359
20.	I feel best when (I am assigned a difficult job.)	.084	.472
28.	It gives me great staisfaction (to undertake very difficult tasks.)	.245	.673

31.	I like others to think of me as (very industrious.)	.380	.663
35.	I am always careful (to do my best in whatever I undertake.)	.538	.647
36.	I have a general tendency (to continue a work till it is finished.)	.512	.585
44.	I enjoy a long spell of continuous activity to solve a difficult problem.)	.225	.524

The high loadings of Factor C on items such as 35 and 36 immediately suggest that the factor is associated with persistence of behavior. As such, the factor is identified as Perseverance.

Factor D was labeled Aspiration. The important factor loadings was:

Factor D (Aspiration)

Item No.	Item-description	Rotated Factor Loadings ϕ	 r_t
13.	I consider myself better than those (who do not have any aim of life.)	.215	.432
21.	I frequently aspire to be (a man with wonderful achievements.)	.435	.228
26.	My secret ambition in life is (to establish a glorious record of achievements.)	.582	.919
30.	What I want most in my life is (to do something requiring effort.)	.558	.525

The largest loading on Factor D is shown by Item No. 26 which certainly pertains to aspiration of life and as such both analyses suggest that the factor can be labeled as Aspiration.

Factor E could be more readily interpretable from the solution obtained using tetrachoric correlation than from the phi. However, for the sake of comparison, loadings for both are reported below.

Factor E (Difficult task)

Item No.	Item-description	ϕ	r_t
26.	My secret ambition in life is (to establish a glorious record of achievements.)	.236	.445
27.	I like to do something which (others can hardly do.)	.329	.556
30.	What I want most in my life is (to do something requiring effort.)	.208	.440
32.	In judging my merit, I believe that (my grades were not a fair index of my work.)	.302	.509
34.	I am (quite punctual and am never late for work, school, appointment, etc.)	.394	.539
41.	I am often tempted (to undertake very difficult task.)	.271	.741
44.	I enjoy (a long spell of continuous activity to solve a difficult problem.)	.487	.690
46.	I prefer (difficult tasks to easy ones.)	.369	.578

Interpretation of this factor in terms of an eagerness to undertake difficult tasks seems possible from the large projections on Item Nos. 41, 34, and 46.

In the case of remaining two significant factors, there occurs a noticable difference between the factor saturations obtained for the phi intercorrelation matrix on the one hand and the tetrachoric correlation matrix on the other. As such, individual interpretations have been advanced for each of the factors associated with the different matrices. In the case of phi intercorrelation matrix, the sixth factor (Factor F) is defined by the following items:

Factor F (Satisfaction in Difficult tasks)

Item No.	Item-description	Loading on the sixth factor for ϕ
20.	I feel best when (I am assigned a difficult task.)	.507
28.	It gives me great satisfaction (to undertake very difficult tasks.)	.592

In view of the large projections on Item 20 and Item 28, a tentative interpretation can be made of the factor in terms of satisfaction in undertaking difficult tasks. The factor needs to be differentiated from Factor E which also we identified as something associated with task difficulty. The only difference that appears plausible is that whereas Factor E is concerned with the preference for difficult tasks, Factor F pertains to the emotional satisfaction connected with the undertaking of difficult tasks.

The sixth factor that emerges from the tetrachoric intercorrelation matrix seems equally difficult to interpret. However, a tentative interpretation of the same in terms of anxiousness to do something great is possible as can be seen from the following items and their factor loadings:

Factor F' (Anxiety)

Item No.	Item-description	Loading on the sixth factor for r_t
33.	I wish the atmosphere (in my home were more cogenial to study.)	.605

38.	I am anxious (to do something of great significance.)	.600
39.	In general I might be described as (optimistic.)	.660
47.	I avoid (those situations which are not competitive.)	-.400
50.	I would like to solve (very difficult puzzles and quizes.)	-.404

The seventh and last significant common factor which can account for the phi intercorrelations among the fifty test-items has appreciably high projections on the following items:

Factor G (Maintenance of self-respect)

Item No.	Item-description	Loadings for the ϕ
5.	My aim of life is (to make a long record of successful achievements.)	.433
10.	I believe that it is possible for me (to be a recognized authority.)	.519

Both the above items reflect certain amount of resoluteness, a sense of determination to accomplish something. Thus they are conscious expression of one's willingness to maintain self respect and pride on a high level and as such a tentative label for Phi Factor G can be given in terms of Maintenance of Self Respect.

The last significant factor to be postulated here in order to explain the tetrachoric intercorrelations is defined by the following variables:

Item No.	Item-description	Loadings for the r_t
25.	I feel (unhappy when I fail to do my best in the examination.)	-.398

39. In general I might be described as (optimistic)	.337
49. I believe that (my future depends upon my doing some notable work.)	.624

It appears from the above that the factor is bipolar in nature. The interpretation of this factor in terms of optimism seems plausible in view of the fact that Item 25 has a negative loading on it Item 39 has a positive loading on it although both of the loadings are not very high.

C. Discussion

The results of the factor analysis reported in this chapter show clearly that some of the main aspects of achievement motivation such as aspiration, ego-ideal, perseverance, identification with a successful authority, preference for difficult tasks, etc. have been covered by the 50 items of SCT that were retained after item-analysis. However, none of the factors identified by Mitchell (1961), namely academic motivation, wish-fulfillment motivation, non-achievement motivation, wish fulfillment, self-satisfaction, and external pressure to achieve, was found in the present study. Since seven common factors emerged from both the analysis, it appears then that there are several sets of homogeneous items each set defining a particular factor. Such homogeneous subset of items may not necessarily represent a phenomenon of deep underlying significance for the understanding of achievement motivation but they may still be very useful for the purpose of describing and predicting behavior associated with achievement motivation. The study therefore, demonstrates that the Sentence Completion Test has high "factorial validity" (See Anastasi, 1963, p. 148).

The study further demonstrates that when parallel factor analysis is carried out with tetrachoric and phi intercorrelations, the one will show just as many factors as the other one, although the factors so emerging may be a little different from each other. The obtained communalities reported in Table s 20 and 21 further substantiate the observation made by Comrey and Levonian (1958) that the tetrachoric frequently leads to reasonably high communalities. The obtained communality for Item 26 is well above unity when the analysis is based on the tetrachoric correlations. The communality for the same variable using the phi correlations turned out to be .47. One possible explanation, as observed in the present study, can be advanced in terms of the higher zero order correlations between two variables when tetrachoric correlation rather than phi is computed. In any case, the study did not reveal any spurious factor which could be attributed to the use of phi in the factor analysis. On the other hand, it showed that although the loadings were generally low in the case of phi than with tetrachoric which resulted in the extraction of seven factors accounting for only 22 per cent of the total variance, yet the interpretation of the factors was equally difficult in both the cases. Moreover, since the factor analysis of phi coefficients gave us more or less the same results with fewer undesirable side effects such as communalities over unity as in the case of tetrachoric, the study lends additional support to Comrey and Levonian's (1958) thesis that "in certain cases the phi coefficient is much better for factor analytic work than is generally believed" (Comrey & Levonian, 1958, p. 754).

DEVELOPMENT OF A CONFIGURATIONAL KEY FOR SCT

A. Introduction

A number of tests and inventories are now scored following certain configurational keys, on which the responses are credited not in terms of just right or wrong but in terms of a particular pattern of response. The inventories well known for such configural scoring are the Strong Vocational Interest Blank and the MMPI. Initially, the configurational keys for these inventories were developed in order to increase their validity following the intuitive suggestion that certain configurations of responses taken individually are more meaningful and may be more discriminative than the linear combination of groups of items scored as right or wrong. The intution has been supported mathematically by various workers (Meehl, 1950; Horst, 1954; Lykken, 1956; Lubin and Osborn, 1957). If these configurations could be identified in some manner, they should help considerably in separating criterion groups from men-in-general groups, various types of individuals from other types, successful people from unsuccessful ones, etc. Psychological tests and inventories could be strengthened immensely by utilizing the relatively unique configurations of responses given by individuals. An earlier article by Gaier and Lee (1953) discusses the advantage of the configurational approach at greater length. In developing a configurational key for the SCT all these advantages were taken into consideration. In addition the possibility exists that one can minimize faking to a great extent by using a configuration key developed on the basis of the typical response pattern of two extreme criterion groups.

In demonstrating the worth of the proposed configurational key of SCT, it was thought necessary to show that the observed frequency of any one pattern is stable enough to hold up under cross validation. Another important consideration was to examine the worth of configuration key in terms of test-retest reliability, and to compare the coefficient with the one obtained using the conventional key. Configurational approaches have not been popular as yet since several studies do show a rather severe cross validation shrinkage (McQuitty, 1954, 1957 ; Forehand and McQuitty, 1959; Lee, 1956), while others fail to report any attempt at cross validation.

In this chapter, results of two studies will be reported after a brief exposition of the procedure that we followed in developing the configurational key. In the first study, a comparison will be made between the traditional and configurational approaches in terms of certain test statistics.This willbe done to demonstrate the superiority of the latter when the data are based on the validation sample. In the second study, these results have been checked against a new sample.

A. Development of the Configuration Key

Subjects

Nearly 300 completed answer sheets were selected randomly from the test file and the answer sheets for the first 70 persons who scored 20 or more on the SCT, and the first 70 persons who scored 13 or lower were chosen for the development of the configuration key.

Procedure

For each individual belonging to either the high n Ach group or low n Ach group (classified in terms of the total raw scores), the response pattern was recorded for every item on specially constructed chart. Since there were three possible answers to a particular item stem in the test, and each S was required to encircle one of the alternatives which truely corresponded with his feelings and to cross out the one which least corresponded with his feelings, there are six possible answer patterns which any individual may have selected. These are shown on the left hand side of Table 22 which also displays the frequencies with which the given answer patterns were found to occur for the high and low n Ach group on item 1.

TABLE 22

Answer Patterns and their Frequency of Occurrence in High and Low n Ach Groups for Item 1

Pattern Number	Most Correspond			Least Correspond			Frequency of Occurrence of Answer Patterns in		Total
	A	B	C	a	b	c	High Group	Low Group	
1	1	0	0	0	0	1	1	10	11
2	0	1	0	0	0	1	0	2	2
3	0	0	1	0	1	0	39	13	52
4	0	0	1	1	0	0	7	2	9
5	0	1	0	1	0	0	4	1	5
6	1	0	0	0	1	0	17	41	58

In Appendix E, frequency of occurrence associated with each of the six patterns are tabulated for the remaining items of the test. From Table 22 , we can readily see that the pattern which is typical of the

High n Ach group is pattern No. 3 which indicates that most persons of this group encircled response C and crossed out B while responding to Item 1. The typical response pattern for the low n Ach group is Patter No. 6 for Item 1. Therefore, anybody showing response pattern 6 while responding to Item 1 should be given -1 whereas Pattern No. 3 should be given a credit of 1. In order to be further sure that such scoring will discriminate most between the high and low n Ach groups of the validation sample, 15 Four-fold tables were prepared for analysing each item. The two response patterns which discriminated most between the two criterion groups were selected. The discrimination index used for this purpose was the phi coefficients. The phi coefficient corresponding to each selected configuration patterns appears on the Table included in Appendix E.

For the purpose of illustration, we reproduce below a few four-fold tables used in selecting the configurations for scoring Item 1. In all these tables capital letter stands for the alternative which the S encircled and small letter indicates the alternative that was crossed out.

TABLE 23

Examples of Four-fold Tables constructed for Obtaining Pattern Scores for Item 1

Group	Ab	Ba	Total
High	17	4	21
Low	41	1	42
Total	58	5	63

Ø = .29

Group	Ba	Cb	Total
High	4	39	43
Low	1	13	14
Total	5	52	57

Ø = .0003

Group	Cb	Ab	Total
High	39	17	56
Low	13	41	54
Total	52	58	110

$\phi = .456$

Group	Cb	Ca	Total
High	39	7	46
Low	13	2	15
Total	52	9	59

$\phi = .023$

It can be readily seen from above that the phi coefficient turns out to be the largest when Pattern No. 3 (Cb) is pitted against Pattern No. 6 (Ab). Therefore if we give one point when the subject encircles C and crosses out b, and minus one if he chooses Pattern No. 6 (Av), the scoring will yield maximum discrimination. Following this procedure, only those patterns were selected for each item that showed maximum discrimination between the criterion groups. In Appendix F, the configuration key is given for each item. For any item, the response pattern identical to the one given at the right side is scored as one, whereas the response pattern appearing at the left margin is scored as minus one. All other response patterns are scored as zero.

B. Stability of the Selected Response Patterns

In order to study how stable are the response patterns selected configurational keying, test-retest reliability was obtained using the records of 71 subjects from Sample No. 4. These subjects were retested after nearly three months. Test-retest reliability as well as Internal Consistency reliabilities were also estimated from the same data using the conventional key for the purpose of comparison. The correlations between these two keys and the Murray (1938) 17-item n Ach scale were calculated separately to see whether or not the use of the configurational key increases congruent validity for the validation sample.

Results

The reliability estimates for the configurational as well as conventional key are displayed in Table 24.

TABLE 24

Reliability Estimates of SCT shown separately for the Conventional Key and Configurational Key

Kind of Reliability Estimate	Conventional Key	Configural Key
Test-retest Reliability	.750	.730
Odd-even Reliability (No correction)		
First Administration	.544	.479
Odd-even Reliability (No correction) Second Administration	.781	.554
Analysis of Variance		
(First Administration)	.650	.672
Analysis of Variance		
(Second Administration)	.790	.670

The intercorrelation between the two keys was found to be very high. For the first administration, it was .811; for the second, the coefficient was almost .77.

The frequency distributions of SCT scores based on the data of 71 Ss following the configurational key are shown in Figure 3 separately for the two administrations.

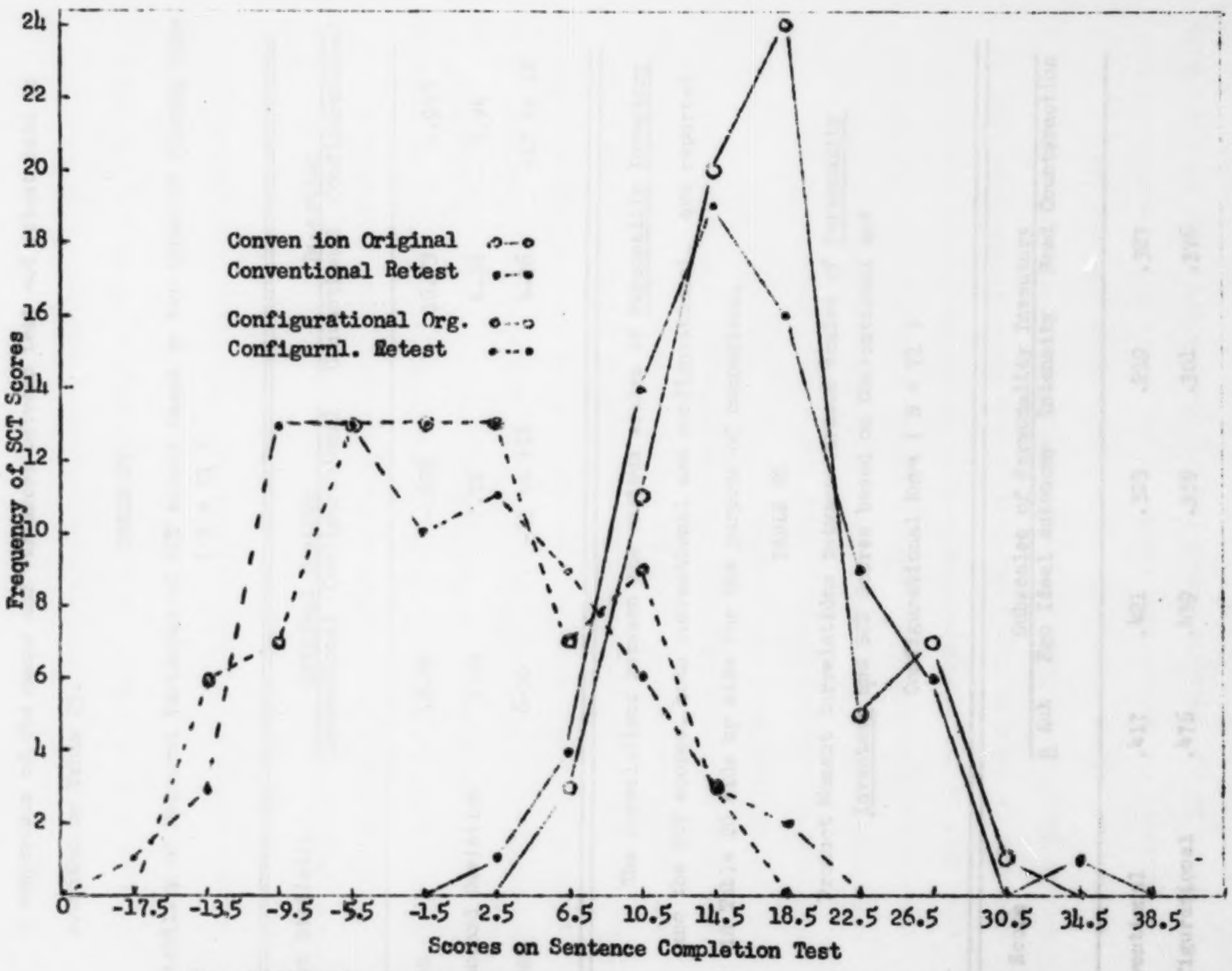

Fig. 3 Distribution of Scores on Sentence Completion Test for 71 Subjects

A comparison of the means and variances between test and retest data is provided by Table 25.

TABLE 25

Stability of Measured Variances of SCT scores based on two types of Scoring Keys (N = 71)

Test Statistic	Original Testing		Retesting	
	Conventional	Configurational	Conventional	Configurational
Mean	16.82	-.296	16.73	-.958
Standard Deviation	5.09	7.72	6.38	7.94
Range	6-30	-15 to +14	4-36	-17 to 18

The correlations between the various scales of Personality Inventory and the SCT scores, both conventional and configurational, are reported in Table 26 side by side for the purpose of comparison.

TABLE 26

Product Moment Correlations between various scales of Personality Inventory and SCT Scores based on Conventional and Configurational Keys (N = 71)

SCT Score	Subscales of Personality Inventory				
	n Ach	Ego Ideal	Autonomy	Intensity	Need Counteraction
Conventional	.417	.421	.323	.219	.327
Configurational	.476	.439	.359	.301	.376

Discussion

Inspection of Table 24 reveals that the test-retest reliability of SCT configurational scores is in no way inferior to the reliability based on the conventional key. The internal consistency reliabilities for both the keys appear to be equally satisfactory. The statistics reported in Table 25 also indicate that the two keys yield more or less the same results when original scores are compared with the retest scores.

The reliabilities reported in Table 25 supply some relevant data concerning the stability of the response patterns selected for the proposed configurational scoring. If the cross-validation shrinkage is caused by the instability of the patterns, then these test-retest reliabilities should be lower than those of conventional scores based on item-scoring. Surprisingly, these pattern scoring reliabilities are more or less of the same general magnitude as those for the SCT score based on conventional key. This seems to indicate that the criterion patterns are as stable over time as the individual item responses.

When the configurational scoring approach is compared with the conventional one in terms of congruent validities, we find from Table 26 that the coefficients are relatively higher in favor of the coefiguration key. This is easily understandable since the configurational scoring of each item is based on that particular pattern which discriminates most between the high and low n Ach groups of the validation sample. The crucial test of the superiority of the configuration key over the conventional one depends upon whether or not the validity coefficients hold up better in the cross-validation sample. The present study, however, shows that the configurational key is as good as the conventional key in terms of reliability and a little better in so far as congruent validities are concerned.

C. Congruent Validities of the Configurational Key on a Cross-Validation Sample

In order to assess further the worth of the configurational key, a congruent validity study was made on a new sample. An attempt was also made in this study to see if the combined use of both conventional item key and the proposed configurational key can improve the overall congruent validity of SCT. This was done by applying Hotelling's (1935) canonical correction analysis to the intercorrelation data. The method consists of assigning weights to the individual elements of the criterion set (both SCT scores) so that the composite score will be such as to give highest multiple correlation with the predictor set (Five scales of Personality Inventory).

Subjects[4]

Seventy-nine undergraduates enrolled in an Introductory Psychology Class during Summer 1964 (regular) semester at the Bloomington Campus of Indiana University served as the subjects for this study. There were 34 male and 45 female students in this sample. Their mean age was almost 20 years although the ages ranged from 16 to 34 yrs. They were already acquainted with the concept of achievement motivation at the time SCT was given.

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[4] The cooperation of Dr. James Allison in permitting his students to participate in this study is greatly appreciated.

Procedure

The SCT was administered during a regularly scheduled class period in which the attendance was almost 90 percent. After a brief introduction, all Ss were asked to read silently the instruction appearing on the title sheet of SCT. After all of them had done so, they were given a ready signal to start and fill out the SCT answer sheet as quickly as possible. Enough emphasis was given on their being honest and candid while replying to the different items. They were also impressed with the fact that a strict confidence would be maintained in keeping their records. Almost 80 percent of the Ss completed the test within 25 min. A few who were still working were allowed to continue until they finally completed. After the Ss took the SCT, a copy of the Personality Inventory was distributed to each of them which they took at home and filled out in their leisure time. Almost 87 percent of the students turned in the completed questionnaire within two days.

Results

The intercorrelations among the various scales of the Personality Inventory and the SCT Scores (conventional and configurational) are shown in Table 27. The table also shows the mean and variance for each of the variables at the bottom.

TABLE 27

Product Moment Intercorrelations among Scales of Personality Inventory and SCT scores together with the mean and variance of each Variable

(N = 70)

Variable	SCT		Personality Inventory				
	convn. 1	confgn. 2	n Ach 3	Ego Ideal 4	Auton. 5	Int. 6	n Counteract. 7
1	1.000	.772	.218	.230	-.024	.194	.007
2	.772	1.000	.197	.364	.079	.098	.125
3	.218	.197	1.000	.271	.073	+.313	.350
4	.230	.364	.271	1.000	.039	-.143	.279
5	-.024	.079	.073	.039	1.000	.042	.258
6	.194	.098	.313	-.143	.042	1.000	.256
7	.007	.125	.358	.279	.258	.256	1.000
Mean	21.014	1.914	7.643	3.014	1.828	2.728	3.243
S.D.	7.0989	8.1396	2.8439	1.2966	1.4273	1.3284	1.4007

The canonical correlations between SCT scores, both conventional and configurational, and the predictor set consisting of all the five subscale of Personality Inventory turned out to be .404 and .307. The computations were done using the BIMD 06M program prepared for IBM 709. The largest canonical correlation was found to be significant at the .01 level following the test procedure suggested by Bartlett (1941). The canonical coefficients associated with the criterion (SCT scores) as well as the predictor sets are shown in Table 28 separately for the two canonical correlations.

TABLE 28

Regression Weights to be Applied to the two SCT scores (Predictors)
and Raw scores on various subscales of Personality Inventory
to produce the canonical variates corresponding to
Two canonical Correlations (N = 70)

Variable Name	Regression(Canonical)Weight	
SCT Score (Conventional)	-.04697	-1.57383
SCT Score (Configurational)	-.96328	1.24549
n Ach	-.16768	-.41331
Ego Ideal	-.93990	.12101
Autonomy	-.16173	.32121
Intensity	-.37206	-.63413
Need Counteraction	.16008	.66369
Canonical Correlation	.4043	.3073

It can readily be seen from Table 28 that in the overall association between the two sets, the configurational scores assumes a major role within the criterion set and the Ego Ideal contributes more than any other predictor variables in maximizing the assoication.

Discussion

From Table 27, it should be evident that the use of configurational key increased the correlation between almost all the subscale of Personality Inventory excepting Intensity and the Sentence Completion Test.

This certainly is quite promising although the congruent validity of the SCT conventional key on the cross-validational sample is not satisfactory. It is also interesting to note that the use of configuration key resulted in a decrease of the correlation between Intensity and SCT. However, the configuration key shows a high correlation originally obtained with the Sample 4 (N = 71). For the cross-validation sample, the other test statistics are closely comparable to those obtained with Sample 4. The means and variances also do not appear to be much changed for the cross-validation sample with regard to most of the variables under study. Our major finding thus suggests that the configurational key proves to increase the congruent validities of SCT in the cross-validational sample. Still the validity figures are low enough compared to those obtained for the validation sample upon whose data the configuration key was based, after the subjects of this sample were classified arbitrarily as high or low n Ach in terms of their scores on SCT. The high correlation between the conventional and the configurational keys indicates that the present configurational key of SCT is not a significant advance over the conventional one if prediction is the main concern. The data indicate that further studies are needed before the worth of the present configuration key is clearly demonstrated. However, the results of the canonical study do support the idea of using both the keys. Their combined use is expected to increase the multiple correlation between these and any other external criterion. In addition, it might help in reducing the effect of faking when the testee is aware of the purpose of the test as in personnel selection. In preparing further configurational keys, attempts should be made to obtain the data from two extreme groups, based on some external criterion such as amount of creative work etc. The configurational key which typically represents the response patterns of the high achievement motivation group on the one hand and the low achievement motivation group on the other, is theoretically bound to give a better congruent as well as predictive validity of the test.

CHAPTER VIII

SUMMARY AND CONCLUSIONS

The major objective of the research reported here was to develop a structured test of achievement motivation consisting of forced-choice triads which would provide for some built-in controls for faking. The need for developing such a tool was suggested by the fact that the existing projective tests of achievement motivation, such as McClelland's test of n Ach, French's Test of Insight, Iowa Picture Interpretation Test lack the reliability necessary for prediction. Even, the available structured tests of need achievement such as Edwards PPS n Ach scale or the Heilburn scale derived from the Adjective Check List appeared unsatisfactory from several points of view. In the development of the proposed test of achievement motivation, the main technique that was followed is Wherry's method of pairing items objectively on differential "face-validity" and subjectively on social desirability. After an item-analysis of 78 triads, 50 triads were retained on the basis of their item-total correlation. Administration of the final form of the proposed test under the title of Sentence Completion Test (SCT) to several samples revealed that the sampling fluctuation of certain descriptive statistics based on the SCT scores is not very high. Additional results which have important bearings upon the properties of the SCT may be summarized as follows:

1. The test-retest reliability of the SCT was found to range from .71 to .75.
2. The split-half reliability and internal consistency reliability were also high.

3. The SCT showed significant relationship with a few mental tests which call for simple skills or abilities such as the rapidity with which identical figures are located, code-substitution, sound grouping. The finding was interpreted in terms of a general motivational strength to excel others in situations where "sense of achievement" presumably is the only factor.
4. In the congruent validity study, the SCT showed high positive relationship with the following scales, the items of which were borrowed from Murray's manifest need scales: n Ach, ego ideal, and need counteraction.
5. Evidence of construct validity of SCT is borne out of three separate studies. The first study showed that subjects with high scores on SCT rated themselves significantly higher on perseverance, and significant lower in intelligence as compared to others. In investigating the hypothesized relationship between achievement motivation as measured by SCT and rate of performance on a simple perceptual speed task, we found that the high scorers showed a better rate of performance from the second trial to the end of practice than the low scorers. In the third study which was done in the framework of level of aspiration experiment, certain interesting relationships were observed which lend additional support to the validity of SCT as a measure of n Ach.
6. A factorial analysis of the item-intercorrelation matrix was done; the results of which are indicative of the "factorial validity" of SCT.

7. All these studies referred to above were done using the raw SCT scores derived from the scoring of each item of a triad as right or wrong. In addition to this conventional scoring key, the use of a configurational key was suggested. The worth of the proposed configurational key in terms of its test-retest reliability as well as cross-validation results was examined. The use of the proposed key along with the conventional one is recommended.
8. Further validation studies are needed before the test is accepted as a valid instrument for measuring n Ach. However, its use for research purpose is recommended.

Implications for Further Research

Although the proposed test was found to be internally consistent, reliable and even valid for predicting certain types of relationship, no attempt has been made in the present study to demonstrate its superiority over the other available measures of n Achievement. Although no significant relationship is expected between SCT and McClelland's measure of n Ach, it will be interesting to see how the two measures correlate. Similarly by giving a group of subjects both the SCT and The EPPS, a comparative evaluation of the two tests particularly in terms of the stability of item responses over period of time and in terms of construct and congruent validities should be made as early as possible.

No attempt has been made in this study to see also how far the matching of the items within a triad has effectively been done to eliminate the influence of social desirability. The fakability of SCT also needs to be investigated particularly if the tool is to be used for the purpose of academic screening or selection of certain types of executives. In this connection, the worth of the proposed configuration key in safeguarding fakability should be investigated.

It appears from the initial analysis that the proposed tool is more concerned with measuring the "hope of success" aspect of achievement motivation than with the "fear of failure". The factor analysis study as well as the observed lack of relationship between SCT and Taylor's MAS lend very indirect evidence of the above observation. A more straight forward verification of this is necessary by undertaking a study very similar to that of McClelland and Litwin (1960). Studies similar to those undertaken by Clark _et al_ (1956) using McClelland's test are also recommended in this connection.

Although one may cast doubt on the nature of any generality which may be made regarding the relationship between _n_ Ach and academic performance by the studies of Lazarus _et al_ (1960), Broverman _et al_ and more recently of Cole _et al_ (1962) it still seems quite plausible that there should be a positive relationship between the two variables when ability factors are held constant. Any good measure of achievement motivation particularly constructed for college students ought to cover this aspect of _n_ Ach also. This remains to be seen for the proposed test.

In addition to these studies, certain norms for the test need to be prepared apart from the standardization of its administration and scoring. Such studies are currently being planned for the future. A cross-cultural study of the American and Indian college students is also under-way.

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APPENDIX A. SPECIMEN COPY OF THE FINAL FORM OF

SENTENCE COMPLETION TEST

By

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Indiana University

DIRECTIONS

On the following pages are a number of partly completed sentences. Each can be completed meaningfully if you link it up with any of the alternatives offered. Note that each of the three answers is equally good to make the incomplete sentences meaningful and complete. As this is neither a test of your intelligence nor of your proficiency in the use of English, there is no question of a right or wrong answer. You are to select only two answers, one of which should correspond most and the other correspond least with your present likings, feelings or attitudes. Look at the example below:

I like to .... A. keep things neat and orderly.
B. do things for my friends.
C. undertake tasks requiring skill.

Which of these answers is more characteristic of what you like? If you like "keeping things neat and orderly" more than the other two activities, then you should put a circle around the letter A on the answer-sheet given to you separately. Put a cross mark on the answer-sheet against the letter which stands for an answer that characterizes what you like least.

The incomplete sentences on the following pages are similar to the example given above. On the answer sheet are numbers corresponding to the numbers of the different sentences. Each number is followed by the letters A, B and C. Draw a circle around the letter on the answer-sheet which indicates the answer that corresponds most with your characteristics. Put a cross for an answer that is least characteristic of you.

Please note that your answers should be in terms of what you like or feel at the present time and not in terms of what you should think or how you think you should feel.

YOU ARE REQUIRED TO ANSWER ALL THE ITEMS. Do not skip any. Work as soon as you can. PLEAST DON'T PUT ANY MARK ON THE TEST BOOKLET.

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SENTENCE COMPLETION TEST

PI DI

A. to be faithful to my friends and colleagues 4.83 .10
1. I like ....B. to be very systematic in my work. 4.72 .82
.51 C* to do my best in whatever work I undertake. 4.76 6.10

A. to be neat and clean. 3.81 .1
2. In accomplishing a task, I like...41B* to do it much better than others 3.92 5.1
C. to finish it before time. 3.75 .1

.39 A* successful in doing difficult jobs 5.12 6.1
3. I wish I could have always been....B. generous with my friends. 5.01 .0
C. sympathetic to the sick and poor. 5.23 .0

A. to take the lead. 6.01 .2
4. When working in groups, I desire..4B* to excell others in similar tasks 6.15 6.3
C. to do everything in orderly fashion 6.59 .0

.4A* to make a long record of successful achievements. 6.52 6.5
5. My aim of life is............
B. to serve my nation. 6.57 .0
C. to attain high status in the society. 6.23 .3

A. a silent worker in uplifting the poor. 5.91 .1
6. I often desire to be....53.B* successful in doing something very significant. 6.33 6.0
C. a true devotee of God. 5.12 .0

A. support charities. 6.53 .0
7. I am of the opinion that for B. get the basic ammenities of life 5.81 .0
pleasure and happiness one must.....C* enrich the record of one's achievements. 6.32 6.2

A. the easiest path to achieve salvation. 5.12 .1
8. I want to know.....52.B* how I can be successful in whatever I undertake 5.4 6.4
C. the honest means of accumulating wealth. 5.6 .2

A. reading fiction, adventure, travel, etc. 4.17 .9
9. I like............... B. visiting different places of the world. 3.25 .0
.43 C* to think of my future career. 3.11 3.0

.56 A* to be a recognized authority. 6.4 5.1
10. I believe that it is possible for me..B. to achieve social status. 5.5 1.2
C. to get sufficient power in my hands. 6.42 2.4

A. to be a popular social reformer. 6.1 2.1
11. I frequently desire ......B.. to be a great political leader. 6.2 3.2
.56 C* to do something of great significance. 6.0 6.3

A. about being truthful as much as possible. 6.51 .0
12. I am very serious....... B. about helping those who really deserve help 6.2 .0
.65 C* about being a great man in my own job or profession. 6.8 6.5

4.12 4.1
.54 A* who do not have any aim in life.
13. I consider myself better than those..... B. who are unsocial in nature3.28 .0
C. who are irresponsible. 4.29 .2

.39 A* I can do something very valuable. 5.47 5.3
14. I will be very happy if ....B. I can earn a lot. 6.01 2.1
C. I can be my own boss. 5.93 1.2

A. have devoted their life in social service6.0 1.1
15. I like to praise those who.39..B*. have earned a reputation in their own field. 5.3 6.3
C. have some principles of life. 4.97 .0

A. I like to make advance plans. 5.31 .0
16. In whatever work I undertake.48..B* I like to do my very best. 5.09 5.3
C. I like to assume full responsibility for it.
4.97 2.0

A. to keep things neat and orderly. 5.19 .0
17. It is my nature....... B. to do things for my friends. 5.01 1.3
.52 C* to undertake tasks which require great skill5.53 6.1

A. friendly and sympathetic with those in trouble6.12 .0
18. I like to be.......... B. a great authority in some job or profession6.38 6.5
.46 C* very systematic in all my activities. 5.53 6.1

A. to fight for a noble cause. 6.12 .0
19. I am always keen.....39.B* to remove segregation and other social evils6.38 6.5
C. to develop my qualifications. 5.91 1.0

A. I tell others about my personal experience. 3.39 .2
20. I feel best when.....52 B* I am assigned a difficult job. 4.12 6.2
C. I am requested to give advice to others. 3,17 1.0

.28 A* a man with wonderful achievements. 6.72 6.8
21. I frequently aspire to be..B. a very rich man. 6.69 4.3
C. a happy-go-lucky man. 6.81 0.8

A. making others happy. 6.31 1.3
22. I am happiest when....3B* successful in my work. 5.72 5.7
C. I become the center of other's attention. 6.02 2.1

.35A* accomplishing something great. 6.91 6.7
23. I often think of...... B. helping those who are hurt or sick. 6.12 1.5
C. being respected as a leader. 6.78 2.3

A. to forgive those who have hurt me. 5.51 .0
24. I like to be able..... B. to use words that others do not know the meaning of.
C. to do things better than others.5.27 5.3 5.03 3.8

.29 A.* unhappy when I fail to do my best in the examination. 6.37 5.7
25. I feel...............B. depressed when I hear about somebody's death.5.91 .0
C. angry when I see injustice done to my friend.6.03 .0

A. to enjoy a happy married life. 6.69 .2
26. My secret ambition in life is....B. to obtain a highly paid job. 6.59 3.1
.41 C* to establish a glorious record of 6.61 7.0
achievements.

.41 A* others can hardly do. 5.31 6.1
27. I like to do something which...B. will make me wealthy. 5.93 2.9
C. others regard as a manifestation of leadership. 5.61 1.2

A. to supervise and direct others. 5.92 2.7
28. It gives me great satisfaction..B. to be in the company of distinguished
persons. 5.34 2.9
.21 C.* to undertake very difficult tasks.5.01 4.3

A. I try to be very much conventional1.35 .0
29. In most social situations...23.B* I try to be a little non-conformist.73 3.1
C. I try to seek others attention. .31 .0

A. to get an ideal home life. 6.11 .7
30. What I want most in my life is....B. to do something requiring effort.6.52 5.6
.26 C* to be a popular man in the society 6.42 4.1

A. very intelligent. 6.72 2.7
31. I like others to think of me as..29B* very industrious. 6.51 6.1
C. very much good-natured. 6.01 0.0

A. my grades were justified. 3.12 2.1
32. In *judging my merit, I believe th*.20.B* my *grades were not a fair idex of my*
work. 2.98 3.7
C. my teachers were partial to others.
2.34 2.0

.29 A* in my home were more congenial to study3.17 53
33. I wish the atmosphere.........B. in my school were more democratic. 3.02 0.7
C. in my city were more peaceful & healthy.3.92 0

.22 A* quite punctual and am never late for work, school,511 5.8
34. I am .... appointments, etc. 5.5 2.1
B. quite neat and organized in what I do. 5.8 2.4
C. courageous, but avoid unnecessary danger and risks.

A. to please everybody with my manners. 5.82 .0
35. I am always careful....23B* to do my best in whatever I undertake. 5.59 5.7
C. to perform my activities in my own way. 5.02 23

.24 A* to continue a work till it is finished. 4.12 3.9
36. I have a general tendency...B. to analyze others judgment critically. 4.35 .3
C. to be polished in my manners. 4.42 .0

A. I would take others suggestion. 5.12 1.7
37. Before starting a difficult task.21..B* I would plan its details. 5.19 3.1
C. I would imagine the difficulties that
might arise. 5.43 1.1

A. to know my own defects so as to overcome them. 5.23 1.2
38. I am anxious......27B* to do something of great significance. 5.61 6.1
C. to be the object of attraction in the gorup. 5.73 2.3

.34 A* optimistic 6.02 5.9
39. In general I might be described as..B. tolerant 5.79 .7
C. polite 6.09 .1

A. not to hurt other's feelings. 5.11 .0
40. I take pains.........35B* to overcome obstacles and attain a high standard. 5.28 5.3
C. to avoid blame from others. 5.09 .0

.31 A* to undertake very difficult tasks. 4.71 5.1
41. I am often tempted.....B. to see new places, new people and new things 4.25 .0
C. to be sympathetic with those who are unhappy 4.67 .0

A. I will be achieving true freedom 6.17 2.7
42. I am sure that after ten years.....B. I will be earning a lot. 6.21 4.3
.21 C* I will be recognized authority in my field. 6.18 6.1

A. tolerant of people who hurt me. 5.92 .0
43. I am...................B. a morally upright person. 5.83 .0
.32 C.* determined to work toward a high goal. 5.75 5.8

.39 A* a long spell of continuous activity to solve a
44. I enjoy................ difficult problem. 4.71 5.1
B. the company of fun-loving people. 4.39 .0
C. the company of children. 4.52 .0

A. if I get an opportunity to do some one a favor 5.0 1.3
45. I feel happy.......... B. if I get an opportunity to entertain others with some jokes. 5.22 1.2
.29 C* when I have finished successfully a difficult task. 5.18 53

A. getting encouragement from my friends and elders. 4.79 2.7
46. I prefer......28B* difficult tasks to easy ones. 5.11 5.1
C. the company of older and experienced persons. 4.61 .0

A. gay and irresponsible pleasure-seekers. 3.92 .8
47. I avoid........ B. Mental confusion and chaos. 4.22 2.8
.41 C* those situations which are not competitive. 4.13 5.1

A. I am blamed on my own account. 3.91 .0
48. I feel upset when.....38.B* I fail to reach my desired goal. 4.01 5.9
C. I am neglected or unloved. 4.14 .0

A. it is better to be faithful than famous. 4.10 .0
49. I believe that........B. love is more just than justice. 4.01 .0
.46 C.* my future depends upon my doing some notable work. 4.08 5

A. the socio-economic problems of my country. 5.01 1.3
50. I would like to solve...20B.* very difficult puzzles and quizes. 4.97 4.7
C. those problems which will give me novel experiences 4.89 2.8

Answer Sheet for
SENTENCE COMPLETION TEST

Name ______________________ Age __________ Sex __________

Education ______________________ Date ______________________

---

1. A B C
2. A B C
3. A B C
4. A B C
5. A B C
6. A B C
7. A B C
8. A B C
9. A B C
10. A B C
11. A B C
12. A B C
13. A B C
14. A B C
15. A B C
16. A B C
17. A B C
18. A B C
19. A B C
20. A B C
21. A B C
22. A B C
23. A B C
24. A B C
25. A B C
26. A B C
27. A B C
28. A B C
29. A B C
30. A B C
31. A B C
32. A B C
33. A B C
34. A B C
35. A B C
36. A B C
37. A B C
38. A B C
39. A B C
40. A B C
41. A B C
42. A B C
43. A B C
44. A B C
45. A B C
46. A B C
47. A B C
48. A B C
49. A B C
50. A B C

APPENDIX B. TESTING SCHEDULE FOR SAMPLE 2 (N = 87)

Fall 1962 P 101 Class

Section A			Section B		
Test D	Date	Time Limit in Min.	Test	Date	Time Lt. in Min.
Memory II (Number-Number)	Nov.9	15	Memory II	Nov. 10	15
Verbal Completion	Nov. 9	5	Verbal Completion	Nov. 10	5
Code Words	Nov. 9	20	Code Words	Nov. 10	20
Additiona	Nov. 12	3	Addition	Nov. 13	3
Multiplication	Nov. 12	3	Multiplication	Nov. 13	3
Cubes	Nov. 12	5	Cubes	Nov. 13	5
Verbal Classification	Nov. 12	15	Verbal Classification	Nov. 13	15
Reasoning	Nov. 19	6	Punched Holes	Nov. 20	3
Punched Holes	Nov. 19	3	Reasoning	Nov. 20	6
Figure Recognition	Nov. 19	10	Figure Recognition	Nov. 20	10
Sound Grouping	Nov. 19	9	Sound Grouping	Nov. 20	9
Vocabulary	Nov. 23	15	Vocabulary	Nov. 24	15
Number Code	Nov. 23	8	Form Board	Nov. 25	3
Form Board	Nov. 23	3	Number Code	Nov. 25	8
Memory I	Dec. 5	12	Memory I	Dec. 6	12
Reading I	Dec. 5	8	Reading	Dec. 6	8
Flags	Dec. 5	2	Flags	Dec. 6	2
Verbal Analogies	Dec. 5	20	Verbal Analogies	Dec. 6	20
Arithmetic Reasoning	Dec. 5	20	Arithmetic Reasoning	Dec. 6	20
Word Beginnings	Dec. 16	6	Word Endings	Dec. 17	6
Word Endings	Dec. 16	6	Word Beginnings	Dec. 17	6

PERSONALITY INVENTORY

Name : ______________________ Sex : Age :

Married or single : Education : Date :

DIRECTIONS

Are you interested in knowing more about your own personality ? If you answer honestly and thoughtfully all of the questions on the page that follow, it will be possible for you to obtain a better understanding of yourself.

Your answers to the questions will be treated in the strict confidence. Therefore, feel free to give candid replies. There are no right or wrong answers. Indiacate your answer by drawing a circle around the "Yes", the "No", or the "?" whichever seems appropriate to you for the given question. Use the question mark only when you are certain that you cannot answer "Yes", or "No". There is no time limit; but work as rapidly as possible.

1. I feel fresh ,vigorous and ready for anything, most of the time T F ?
2. I express myself with emphasis when I am interested in a topic T F ?
3. Sometimes I tackle a job as if my life depended on it T F ?
4. I work hard when I work, and play hard when I play T F ?
5. I go at things with considerable zest and gusto T F ?
6. I dream a good deal about my future success T F ?
7. No one can demand from me as much as I demand from myself T F ?
8. I admire immensely and attempt to emulate in one way or another certain great men of the past T F ?
9. I feel that some far goal deserves my effort more than any daily duty T F ?
10. I feel that most of my acquaintances have a rather low standard of achievement T F ?
11. To me a difficulty is just a spur to greater effort T F ?
12. I would rather go without something than ask a favour T F ?
13. I am determined to conquer all my fears and weaknesses T F ?
14. I usually refuse to admit defeat T F ?
15. I often do something just to prove that I can do it T F ?
16. I enjoy work as much as play T F ?

17. I am driven to ever greater efforts by an unslaked ambition T F ?

18. I work with energy at the job that lies before me instead of dreaming about the future T F ?

19. I set difficult goals for myself which I attempt to reach T F ?

20. When my own interests are at stake, I become entirely concentrated upon my job and forget my obligations to others T F ?

21. I feel the spirit of competition in most of my activities T F ?

22. I feel that my future peace and self-respect depend upon my accomplishing some notable piece of work T F ?

23. I work like a slave at everything that I undertake until I am satisfied with the result T F ?

24. I enjoy relaxation wholeheartedly only when it follows the successful completion of a substantial piece of work T F ?

25. I feel that nothing else which life can offer is a substitute for great achievement T F ?

26. I try to avoid situations where I am expected to conform to conventional standards T F ?

27. I am unable to do my best work when I am in a subservient position T F ?

28. I often act contrary to custom or to the wishes of my parents T F ?

29. I go my own way regardless of the opinion of others T F ?

30. I become stubborn and resistant when others attempt to coerce me T F ?

31. I believe that ambition is the parent of many virtues T F ?

32. I have great faith in my own ideas and my own initiative T F ?

33. I can stand very long periods of exertion T F ?

34. I like best that which flies beyond my reach T F ?

35. I am guided in most of my decisions by an over-riding ambition T F ?

36. I have a strong sense of responsibility about my duties T F ?

37. My aspirations are my nearest friends T F ?

38. I believe that man is complete and upstanding only when he would be more than man T F ?

39. No immediate compensation could console me for the failure of my highest hopes T F ?

40. I energize myself by dramatizing my life as an ascending struggle against opposition T F ?

NAME : ______________________ AGE : __________ M/F DATE:

SELF INSIGHT TEST

By
Bishwa Nath Mukherjee
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DIRECTION : - You will find below a list of habits and traits. Read it very carefully and indicate your opinion about your own habits and traits as you see them today.

Cross any of the 9 letters on the left side of the paper to indicate your opinion. You will have to remember that the letter A stands for 'distinctly superior', B for 'considerably above average', C for 'moderately above average', D for slightly above average', E for average', F for 'slightly below average', G for 'moderately below average', H for 'considerably below average' and I for 'distinctly inferior'. Thus, if in your opinion you are 'average' only in "ability to inspire others", please cross the letter E.

It is very important that you give your opinion as honestly as possible. Every thing that you will mention, would be kept in strict confidence. Remember, this is a test of your insight into your 'self'.

A B C D E F G H I 1. Meeting superiors and strangers easily.
A B C D E F G H I 2. Working with energy from beginning to the end.
A B C D E F G H I 3. Habits of doing things in right time.
A B C D E F G H I 4. Remembering things learned.
A B C D E F G H I 5. Not losing hope and courage in difficult and dangerous situation.
A B C D E F G H I 6. Ability to pursuade others.
A B C D E F G H I 7. In being receptive to what others say.
A B C D E F G H I 8. Checking or keeping back your emotions and impulses when provoked.
A B C D E F G H I 9. In being forceful, energetic and persistent.
A B C D E F G H I 10. Doing things as readily for the sake of other people as for oneself.
A B C D E F G H I 11. Doing things or using things in orderly way.
A B C D E F G H I 12. Acting or changing your action according to the needs of the situation rather than acting for the sake of principles.
A B C D E F G H I 13. Ability to assume responsibility without undue strain.
A B C D E F G H I 14. In analyzing the reasons behind your past mistakes.
A B C D E F G H I 15. In expressing very difficult things in a lucid way.
A B C D E F G H I 16. Doing your work as before when others about you have become cold and indiffernet to you.
A B C D E F G H I 17. In developing the skills that your job requires.
A B C D E F G H I 18. Learning new things.
A B C D E F G H I 19. Making others listen to and follow you.
A B C D E F G H I 20. Mixing and working with people whose acts or opinion you thoroughly dislike.
A B C D E F G H I 21. In revising your opinions and judgment.
A B C D E F G H I 22. In understanding desires of others and respecting them.
A B C D E F G H I 23. In comprehending very difficult concepts.
A B C D E F G H I 24. Ability to inspire, teach and direct others.
A B C D E F G H I 25. In seeking new facts, and critically analyzing all the view points gathered.
A B C D E F G H I 26. Enjoying and making funs and jokes.
A B C D E F G H I 27. Power of analysis and ability to arrive at correct conclusion.
A B C D E F G H I 28. Planning and starting work on your own.
A B C D E F G H I 29. Keeping up good spirits in most circumstances.
A B C D E F G H I 30. Doings things in co-operation with others even though you would like to differ.

APPENDIX E

Configurational Key & Phi Coefficient Associated with the Selected Patterns

Item	ø	Plus One	Minus One	Item	ø	Plus One	Minus One
1	.692	Cb	Ab	26	.122	Ab	Ac
2	.524	Ba	Ac	27	.502	Ab	Ba
3	.232	Ac	Ba	28	.243	Ab	Ba
4	.443	Ba	Ac	29	.326	Bc	Ac
5	.674	Ab	Ba	30	.505	Bc	Ac
6	.673	Ba	Cb	31	.503	Ab	Cb
7	.309	Ba	Bc	32	.263	Ca	Bc
8	.235	Ba	Bc	33	.077	Ba	Ca
9	.200	Ba	Bc	34	.296	Ab	Ca
10	.200	Ac	Ba	35	.427	Ba	Ac
11	.470	Ca	Ab	36	.452	Ac	Ba
12	.656	Cb	Ac	37	.679	Bc	Cb
13	.071	Ab	Ca	38	.442	Bc	Ab
14	.174	Ab	Ac	39	.361	Ab	Bc
15	.416	Ba	Cb	40	.502	Bc	Ac
16	.170	Bc	Ca	41	.287	Bc	Ab
17	.682	Ca	Bc	42	.522	Ca	Ab
18	.703	Bc	Ab	43	.404	Cb	Ab
19	.283	Ca	Ab	44	.512	Ac	Ba
20	.562	Bc	Ab	45	.804	Ca	Ac
21	.383	Ac	Ca	46	.452	Bc	Ac
22	.417	Bc	Ac	47	.326	Ac	Bc
23	.661	Ab	Ba	48	.387	Bc	Ca
24	.490	Cb	Ab	49	.274	Ac	Ba
25	.588	Ab	Ca	50	.562	Ac	Ab